THE EDUCATIVE PROCESS

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PREFACE

THE following account of the Educative Process is intended to present a systematic and comprehensive view of the task that is to be accomplished by the school. It covers the field commonly included under the terms, "General Method," "Method of the Recitation," "Theory and Practice," etc.; but it deals with principles rather than with the details of device and "method." The writer is convinced that clear and definite notions of the functions of education and of the laws which govern the educative process will do much toward eliminating the waste of time and energy that is involved in the work of the school. It is not to be expected that the young teacher, even though he be equipped with the best of theory, will prosecute his work with maximal success from the very start. Skill in teaching, like skill in any other art, can come only through persistent practice, coupled with serious study and strenuous self-discipline. But self-discipline reaches up to ideals for control and guidance; and not the least important element in the formation of effective ideals is substantial theory. Theory may well provide a light for the beginner's first steps, making

them less awkward, less incoördinate, than they would be in its absence. Even the work of the experienced teacher, although superficially efficient, may sometimes subvert one or more of the basal principles of the educative process; and it is precisely at these points that an adequate conception of principles, based on the best data that science can offer, must be added to a mastery of technique.

Consistently with this view, the principles presented in the following pages are those that the writer believes to be indispensable in the construction of effective *ideals* of teaching, using the term "ideals" in the sense in which it is employed in Chapters XIII and XIV of this book. Care has also been taken to utilize only those data of psychology and biology that are vouched for by reputable modern authorities in these fields. In the case of nearly every principle presented, the source from which it has been derived is indicated by title and page-references, sometimes to the monographic literature, but, wherever possible, to treatises and text-books that are available both to students of education in the normal school and university and to those engaged in the actual work of teaching who have access to a general library.

Aside from the various specific sources which are thus indicated in detail in the footnotes, the writer wishes to acknowledge an indebtedness of a more general character to the following works: Mr. L. T. Hobhouse's

"Mind in Evolution," Professor E. B. Titchener's "Primer of Psychology" and "Outline of Psychology," and President G. Stanley Hall's illuminating paper, "The Ideal School," which foreshadowed his recently published treatise, "Adolescence."

The book has been read in manuscript by Professor M. V. O'Shea of the University of Wisconsin, and by Professors E. B. Titchener, Charles De Garmo, and G. M. Whipple of Cornell University, to each of whom the writer's gratitude is due for many valuable criticisms and suggestions. He also acknowledges the invaluable service rendered by his colleagues, Dr. Carrie Ranson Squire and Professor W. C. Ruediger, in formulating many of the principles here presented; and by his wife, Florence Winger Bagley, in the patient and helpful criticism which her sympathetic insight and psychological training enabled her to bring to the improvement of the work.

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THE EDUCATIVE PROCESS

PART I. FUNCTIONS OF EDUCATION

CHAPTER I

Education reduced to its Lowest Terms

1. As with all the activities and interests that are fostered by modern civilization, the forces of education have reached a stage of very elaborate specialization and organization. From the kindergarten to the university, each period of development is catered to by a specific kind of education, with its specific aims and ends, its specific standards and ideals, its specific methods and devices. And cutting across these planes of cleavage, which represent the varying needs of the individual at successive levels of his growth, are the almost numberless sciences and disciplines, each with its own vocabulary, its own technique, its own specific function. Not only is the teacher a specialist in education, but he is perforce a specialist in one department of education as distinguished from other departments. And not only this, but he is frequently a specialist in one narrow field of a single department as distinguished from the remaining fields.

In spite of its many advantages, this condition brings with it a very serious difficulty; for while, generally speaking, organization means efficiency, it is none the less true that organization means complexity, and that a complex structure is hard to understand. The layman sees in education a vague, undifferentiated whole; but the novitiate, as his acquaintance continues, watches this whole split up into a myriad of separate parts. For a long time he is troubled by the lack of orderly arrangement, by the seeming neglect of logical continuity and system. He sees a vast, noisy machine, the various parts of which appear to work with little reference to the needs and nature of the whole; not a coördinated system of interacting elements, but a mere aggregation of independent units.

The initial study of any complicated structure involves a similar difficulty. It required thousands of years for science to discover the order and system that govern the organic world, — to "strip the mask from things." The serious student of nature from the very first has been baffled by the multiplicity of living forms, the diversity and seeming independence of species and genera, the unceasing strife and struggle for supremacy, and the resulting waste of time and energy. Yet we now know that each of these factors has its peculiar significance in the complicated scheme of life. Where once the massing of seemingly disconnected units confused and baffled us, we see to-day the harmonious

coöperation of all these factors toward a definite end. The forces that appeared to be independent are now seen to be interdependent, and what looked to be the utter neglect or absence of relation is now revealed as the very apotheosis of system and order. The organic world has been reduced to its lowest terms, and the apparent antithesis of diverse forms and forces has melted away under the new light.

In the study of the concrete problems of education, we need a guiding principle; we need a formula that will cover every case that is presented; we need to know what education means in its simplest terms. Having such a principle, we shall have a basis for interpretation, — a criterion, perhaps, for approval or condemnation. Lacking such a principle, our results will be the merest empiricisms, valuable it may be as separate facts, but totally inadequate to the needs of constructive effort. It is the purpose of this chapter to attempt the formulation of such a principle.

2. Fundamentally the possibility of education depends upon the capacity of the organism to profit by past experiences. In one way or another the facing of past situations comes to modify present and future adjustment. Education in its broadest sense means just this: acquiring experiences that will serve to modify inherited adjustments.

3. In order to understand the fundamental significance of this principle, we must know that the capacity

to profit by past experience is limited to a comparatively few forms of life. In the lower animals, reaction or adjustment is fixed and uniform. It varies only with the nature of the stimulus and not with the results of previous reactions to similar stimuli, — only with the nature of the environment and not with the results of previous adjustments to similar environments. A certain situation "sets off" a certain fixed, unvarying reaction. No matter if that reaction has resulted disastrously in previous instances, the same stimulus will again initiate it; there will be no improvement in adjustment even after repeated trials. The classic instance of the moth and the flame is a case in point. The light impressions "set off" the muscular reactions that carry the moth to the flame. Its wings are scorched and it retreats, — adjustments resulting in the retreating movement having been set off by the effect of the scorching upon the nerve endings. But let the light again impinge upon the sense organs of sight, and the forward movement will again be initiated, — to be repeated, no matter how frequently the scorching may occur, until the stimulus is either withdrawn or replaced by another more compelling, or until the moth is disabled or consumed.

The inborn tendencies to response are termed either reflexes or instinctive movements, according as they are simple or complex. Each follows upon its appropriate stimulus as mechanically as the ringing of an electric bell follows upon the pressing of the button.

4. Reflexes and instinctive movements must be looked upon as products of heredity. The connections in the nervous system upon which they depend are provided for in the development of the embryo just as are the connections between the limbs and the trunk or between the blood vessels and the various organs. To their genesis, too, must be applied the same explanation. How did it come about in the first place that the moth responded in one way to light impressions and in another way to impressions of scorching or pain? One might similarly ask, How did it come about that the original moth (if one may use the term) had wings and legs, a head, a thorax, and an abdomen? In the light of our present knowledge, we can only say that all these determinations of anatomical structure (and nerve structure is anatomical structure) have resulted through the operation of natural selection upon chance variations. All organisms tend to vary, — to deviate in one respect or another from the "normal" or average type. One may have a slightly longer body, another may vary slightly in coloring or markings, another in strength, another in speed, and so on. Where the variation is helpful in the struggle for life, the organism possessing it has an advantage over the organisms that lack it. Consequently the chances that the favored organism will survive and perpetuate its species are increased. Of its progeny, some are likely to vary still farther in the right direction and so on, perhaps indefinitely. If, on the

other hand, the organism is a variant in an unfavorable direction, it will be placed at a disadvantage in the struggle for existence, and the chances of its elimination and the consequent cutting off of its line of descent are thereby increased. It is through this factor of "natural selection" that the origin of specific characters among organic beings can be most satisfactorily explained, and it is to this factor that one must look for an explanation of the origin and development of those connections in nerve tissue that lie at the basis of reflex and instinctive movements.[1]

5. Whatever theory may be called upon to explain the origin of instinct, however, there can be no doubt that a large number of animals are entirely dependent upon instinctive reactions for adjustment to the environment.

[1] It is true that the genesis of instinct presents certain difficulties to this explanation. According to the traditional view, natural selection works only upon *slight* variations, each of which must contribute definitely to the survival value of the organism. While it is easy to see that each slight change in the right direction may have been useful in the development, say, of the horse's hoof, it is not so easy to see how all the intermediate links could have been similarly useful in the development of a complex instinct like the nest-building instincts of some of the birds. Darwin recognized this difficulty and attempted, although not very satisfactorily, to surmount it. (See *Origin of Species*, vol i, ch. viii.) Romanes (*Heredity and Utility*, Chicago, 1896, p 87) prefers to discard the principle of natural selection in the case of instinct, and to look upon instinctive adjustments as inherited habits. Baldwin (*Development and Evolution*, New York, 1903, ch v) disapproves of Romanes's position because it assumes the inheritance of characteristics acquired during the life of the individual. He prefers to think of the slight changes essential to the development of the full-fledged instinct as "kept alive" either by intelligence or by "imitation." This view is also open to objection, for it assumes that mind or consciousness existed prior to instinct In fact, the explanation of instinct by the principle of natural selection seems to be an

Reaction with them is purely mechanical, the same stimulus or combination of stimuli uniformly giving rise to the same adjustment. Such animals are not able to apply experience to the improvement of adjustment, and are consequently not amenable to the influences of education. At just what point in the animal series the lower limit of educability is to be placed is still a matter of dispute, but it is generally conceded that the mammals, the birds, and at least some of the fishes are able to profit by experience in varying degrees, while the invertebrates and the primitive protozoa probably lack this capacity. Some authorities are inclined to exclude the higher invertebrates, especially the ants, bees, and wasps, from the latter class, but there is a marked tendency to look upon even the complex activities of these forms as products of pure instinct.[1] In general, then, it may be concluded

almost hopeless task so long as one maintains that anatomical structures must be developed through a long series of *gradual* changes. Very recently it has been discovered, however, that very pronounced variations are not entirely lost to posterity, but reappear in a definite proportion of the progeny. This discovery, if generally substantiated, will undoubtedly do much toward clearing away these difficulties. (See H. de Vries: *Species and Varieties*, Chicago, 1904.)

[1] For example, A. Bethe: *Dürfen wir den Ameisen und Bienen psychische Qualitaten zuschreiben?* in Pflueger's *Archiv*, 1898. H. S. Jennings (*Contributions to the Study of the Behavior of Lower Organisms*, Washington, 1904) maintains, however, that, even in very primitive animal forms, reaction varies with experience. (See a brief critique of Jennings's theory by J. B. Watson, in *Psychological Bulletin*, 1905, vol. ii, pp. 144 ff.) R. Pearl (*Journal of Comparative Neurology and Psychology*, 1904, vol. xiv, pp. 138 ff.) also believes that adjustment in some forms improves with practice; the machine "works better"; but, he maintains, no psychical element is needed to explain this.

that educability, meaning by that term the capacity to profit by individual experience, is limited to the vertebrates (and possibly the highly organized invertebrates), and is most pronounced in man and his nearest relatives in the animal kingdom, — the lemurs, monkeys, and anthropoid apes, — together with the animals that man has been able to train for his own service, particularly the horse, the dog, and the elephant.

6. But while man shares with some of the higher vertebrates the capacity for education, there is one point in which his position is practically unique. Man *must* be subjected to an educative process before he can complete his development, and this is true in like degree of none of the lower orders. In one sense it is not so much the *capacity for* education as the *necessity of* education that differentiates man from the lower animals.

The moment that the moth emerges from its pupa stage it assumes all the functions of an adult member of its species. It does not have to be taught where and how to procure its food; it does not have to be taught where and how to secure shelter or protection against the elements; it does not have to be taught where and how to lay its eggs and provide for its young. If it does these things, it does them by instinct — by the innate tendencies of the nervous system to react to definite situations in a definite manner. Two essential points are to be noted in this connection: the moth can develop into a mature insect without the presence or aid of other

insects; furthermore, it can develop into *just as good a moth* as either of its parents. Man, on the other hand, comes into the world immature; only a very few of the functions of complete development are present at birth. Certain functions, as, for example, nutrition, are operative from the first, and these are based entirely upon instinct. The infant possesses a nervous mechanism that will respond appropriately to certain stimuli immediately after birth. But the instincts that are operative in the infant are obviously much less efficient than those of the lower forms. Even possessing them the infant is a helpless and dependent creature.

Nor is this all. Suppose that a method were devised by means of which food and shelter could be provided mechanically and the infant left to develop into independent maturity without the aid of parents or other human beings. There is no need to make such an experiment, for the results would be obvious from the outset. The moth is "born" just as good a moth as either of its parents. But the infant, even if he could reach maturity without the aid of other human beings, would certainly not be so good a man as his father. What he would lack are the great essentials of human life that are transmitted, not directly through the germ cell, but indirectly by social contact, — culture, "education," and civilized habits. Professor Baldwin[1] has termed this factor

[1] J. M. Baldwin: *Development and Evolution*, pp. 53–54; also pp. 103 ff.

"social heredity" in contradistinction to physical heredity or physical transmission.

7. It is generally agreed among biologists that the mechanical agency for the transmission of life from parent to offspring is not affected in a significant degree by the experience of the parent. That is, characteristics that are acquired during the life of an organism — even before it produces offspring — are not transmitted through the germ cell (the ovum of the female or the spermatozoön of the male) to the offspring. This principle of the non-transmission of acquired characteristics has not been indisputably established as yet, but that it holds good in the main no one apparently is ready to deny. We may therefore build upon it so far as education is concerned, confident that the objections to its rigid application, even if they be sustained, will not affect the validity of our deductions.

The question of the transmissibility of acquired characteristics forms the dividing line between two contemporary schools of evolutionists. The *neo-Darwinians* contend that acquired characteristics are never transmitted, while the *neo-Lamarckians* maintain that acquired characteristics may be transmitted under certain conditions. A great deal of evidence has been brought forth by both parties to the controversy, but perhaps the most important arguments are these: —

1. In favor of transmission.

(*a*) One of the most important evidences of evolution is the picture of growth and development that is revealed by the fossil remains of plant and animal life found in different geological strata. These remains present a serial progression which,

in some cases, can be actually reproduced by specimens.[1] The neo-Lamarckians argue from this orderly progression that the variations appear in a definite direction.[2] This would seem to indicate that the factor of use or function must have some effect upon inheritance, for, they say, if the variations were promiscuous or accidental, as the neo-Darwinian maintains, we should find among the fossil remains a large number of forms varying from the normal type, some in one direction, some in another, above and beyond those that form the true serial line of descent. That is, in order to account for the chance production of a given useful organ, one would have to believe upon the neo-Darwinian hypothesis that thousands, if not millions, of unfit variations were produced. But, the neo-Lamarckian objects, the fossil beds fail to reveal the remains of these forms as they should had such forms ever existed. Hence the gradual improvement in the adaptation of a series of forms must be explained upon the supposition that, through "use" during the life of the individual, the fit characters became firmly fixed and were then transmitted in a more or less perfect condition to the offspring. Hence the phrase, "use inheritance," as applied to the neo-Lamarckian position.

(*b*) Apart from this deductive argument, factual evidence has been brought forward attempting to show by concrete cases (1) that variations due to mechanical causes have been inherited, (2) that changes due to nutrition in the parent have been inherited, (3) that characteristics developed by the exercise of function have appeared more fully developed in the offspring than they originally appeared in the parent; (4) that organs transformed through disease in the parent have been transmitted in their new form to the offspring; (5) that well-authenticated cases of the transmission of mutila-

[1] For example, the phylogeny of the horse; see E. D. Cope: *Primary Factors of Organic Evolution*, Chicago, 1896, pp 146–150.

[2] Cope, *op. cit.*, p. 13.

tions are on record; and (6) that changes in environment produce changes in bodily characteristics that are transmitted to the offspring.[1]

2. Against transmission.

(*a*) The Lamarckian factor of "use inheritance" was not seriously questioned by biologists prior to 1883. Darwin[2] had assumed the inheritance of acquired characters, but had constructed his theory quite independently of its implications. Spencer assumed use inheritance throughout his "Principles of Biology," and remained to the last an active opponent of the neo-Darwinian hypothesis. In the year named, however, August Weismann asserted that the inheritance of acquired characters was, in the higher animals at least, a physiological impossibility. He based his statement upon the discovery that had recently been made in the field of embryology, relative to the "continuity of the germinal protoplasm." It is now a well-known fact that the cells concerned with reproduction are differentiated and separated from the other cellular elements of the body (the somatic cells) immediately upon the segmentation of the fertilized ovum. Hence the reproductive cells are removed from the influence of those forces that modify the somatic cells. Further circumstances during life cannot directly or definitely affect them; they are amenable only to general influences, such as nutrition.[3]

(*b*) The different lines of factual evidence brought forth by the neo-Lamarckian, and noted above, are controverted in various ways by the neo-Darwinian. He will say, for example, that in the great majority of cases mutilations are not trans-

[1] For a full discussion of this evidence, see Cope, *op. cit.*, ch. viii.

[2] *Origin of Species*, vol. i, ch. i, "As far as I am able to judge, . . . the conditions of life appear to act in two ways,— directly on the whole organization or on certain parts alone, and indirectly by affecting the reproductive system."

[3] A. Weismann: *The Germ Plasm*, New York, 1893; *Vorträge über die Deszendenztheorie*, Jena, 1904.

mitted.[1] The same is true of variations due to mechanical causes.[2] The influences of nutrition and disease, on the other hand, are to be classed among the general influences from which the germinal protoplasm is not free. Variations that are thought to be due to geographical conditions would certainly appear in the offspring as well as in the parent as long as the offspring lived under similar conditions.[3]

Now if an organism has no means of transmitting its acquired characteristics — the products of its experience — to its offspring, any improvement that the offspring may make over the condition of its parents will depend upon one or both of two factors: (*a*) the influence of a more favorable environment in which the various functions will work together to better advantage; or (*b*) the environment remaining the same, a variation that permits in the offspring a more efficient adaptation than was possible in either of the parents.

8. Such are the general conditions of progress in all the lower forms of life. But the non-transmission of acquired characters through the germ cell does not preclude all possibility of transmitting from generation to generation the products of experience. It only pre-

[1] The well known fact that the "docking" of the tails of sheep for several centuries has never produced a variety of tailless sheep is frequently cited.

[2] "The feet of the Chinese do not indicate that their long habit of compression has yet produced any hereditary results." — EDITH E. WOOD: *Notes on Oriental Babies*, in *American Anthropologist*, 1903, vol v, no. 4.

[3] See also W. K. Brooks: *Foundations of Zoölogy*, New York, 1899, lectures iv and v.

cludes such transmission through a certain channel. For animals that come to independent maturity immediately after birth, all other channels of progress are closed. For animals, however, that are cared for during a longer or shorter period of dependence, the possibility of utilizing the experience of the parent and thus of advancing beyond the condition which the parent represents is still open. While it is undoubtedly true that some of the higher forms below man train their young during a plastic period of infancy, it is not altogether clear that this training forms an appreciable advance over the transmission of characters through physical heredity. That is to say, the training in itself is largely instinctive, following the same plan generation after generation, and influenced very little, if at all, by the experience of the parent. And at the very best, of course, the possibility of transmitting experience is, in animals below man, greatly curtailed by the lack of an efficient medium of communication.

It is clear, then, that man's supremacy in the animal series is due to his ability to profit, not only by his own experiences, but also by the experiences of others. Not only is this true, but it is also not to be doubted that, without this twofold capacity, man would be far below many other vertebrates and would be placed at a tremendous disadvantage in the struggle for existence. "Every child is born destitute of things possessed in manhood which distinguish him from the lower animals.

Of all industries he is artless; of all institutions he is lawless; of all languages he is speechless; of all philosophies he is opinionless; of all reasoning he is thoughtless; but arts, institutions, languages, opinions, and mentations he acquires as years go by from childhood to manhood. In all these respects the new-born babe is hardly the peer of the new-born beast; but, as the years pass, ever and ever he exhibits his superiority in all the great classes of activities until the distance by which he is separated from the brute is so great that his realm of existence is in another kingdom of nature."[1]

9. In order still more forcibly to emphasize the fundamental importance of the educative process in human life, it will be profitable to compare man's chances for progress with those of the lower animals.

(*a*) It has been noted above that, leaving out the factor of experience, any improvement that an organism may make over the condition of its predecessors will depend on either (1) the influence of a more favorable environment in which the various functions will work together more harmoniously, or (2), the environment remaining the same, a variation that permits in the offspring a more efficient adaptation than was possible in either of the parents. In what degree will these factors operate in man? It is clear that, as a mobile creature, he can change his environment to one perhaps

[1] J. W. Powell, quoted by A. F. Chamberlain: *The Child*, London, 1900, p. 1.

better suited to his capacities. Assuming his inherited or congenital characteristics to be exact replica of his parents', he may be able, nevertheless, to find an environment where these characteristics would be of better service to him than they were to the latter. This is constantly illustrated by the phenomena of human migration. But, primarily, man is not more mobile than many other mammals and far less mobile than numberless birds and insects. In these lower forms, however, the discovery of a more favorable environment depends largely upon chance, while with man the factor of intelligence operates. If it were not for this factor, together with the secondary means of locomotion which his intelligence enables him to utilize, it is safe to say that, in this particular, man would be at a great disadvantage compared with many other forms, in so far as improvement through change of habitat is concerned.

(*b*) Regarding the second factor, it is clear that, in a changing environment, — such as the advance and retreat of an ice cap, — variations may be produced that will be adaptable to changed conditions and thus serve to perpetuate the line of descent. Can improvements in human adjustment also be laid at the door of variation and, if so, to what extent?

The tendency to variation is common to all forms of organic life, but it differs in degree with different species and genera. Thus, among domestic animals, the cat varies very little as compared with the dog, and the

turkey very little as compared with the barnyard fowl.[1] When we compare man with other animals, we find that his tendency to variation is not particularly marked. Indeed, it is safe to say that man is one of the least variable of all animal forms.

The only important change that has taken place in man's structure since Eocene times has been a marvelous increase in the size of the cerebral hemispheres.[2] This means that during approximately two and one half million years man's bodily structure has remained practically the same, save for this increase in the size of the brain. But even more remarkable is the fact that from Pleistocene times onward — a period of at least a half-million years — there has been very little change even in the form and size of the brain; while it is still more remarkable that, during the period covered by human history, — perhaps eight thousand years, — there has been no apparent change in the gross anatomical structure of this organ. It may be that changes in the microscopical structure have been occurring as the result of natural selection, and that these, as well as the fund of useful traditions at his disposal, have contributed to man's mental superiority. These changes

[1] Cope, *op. cit.*, p. 21.

[2] Cope, *op. cit.*, p. 150, "It is only in the structure of the brain and the reproductive system that man shows an advance over the Eocene type." Keane, on the other hand, admits nothing more than a "generalized precursor, differing specifically from all present varieties," even in Pliocene times. (A. H. Keane: *Ethnology*, Cambridge, 1901, p. 69.)

in the finer structure are, however, yet to be demonstrated. When we remember that this latter period has witnessed the most profound changes in everything that we call human, we are in a position to comprehend in some slight measure the absolute insignificance to man of the factors that make for progress in the lower orders. Away back in Neolithic, perhaps even in Paleolithic, times, Nature finished her work as far as man is concerned. The forces of structural variation, which mean everything to the lower orders, then came to an abrupt halt in the human species. Since that time man's progress has been determined by another factor. We may call this factor culture, we may call it, with Baldwin, "social heredity," we may call it morality, we may call it civilization; but whatever we call it, its essence is education in the broadest sense: the acquisition, the retention, and the organization of experiences that shall serve to modify and render more efficient man's adjustment to his environment.

Measured by all the standards of the brute world, man seems to be almost pitiably unfortunate. Nature has provided other animals with fur coverings for protection against cold, with migratory instincts which lead them to avoid unfavorable environments, with teeth and tusks and claws for offense and defense. Or, if Nature has not provided these things directly, she has at least provided tendencies to variation that have resulted in their development. Man, on the other hand, lacks both the factors and the tendency to variation which might produce them. And yet the lack of a natural covering for the body, the lack of natural weapons, even the lack of a proclivity for variation, have all been positive forces in human progress.

The endowments that man lacks have been too easy a means of survival and progress Nature has always set a premium upon the successful surmounting of difficulties. Throughout the entire range of life, we find that advancement has been correlated, not with what would seem at first glance to be the most favorable conditions, but rather with conditions that have offered serious obstacles to life.

It is beyond doubt that life began with simple, unicellular forms, living at or near the surface of the ocean. Professor Brooks[1] has shown that this is the most favorable environment for the genesis and perpetuation of life that the earth has ever afforded. "At the surface of the ocean the abundance and uniform distribution of mineral food in solution, the area which is available for plants, the volume of sunlight, and the uniformity of the temperature are all favorable to the growth of plants, and as each plant is bathed on all sides by a nutritive fluid, it is advantageous for the new plant-cells which are formed by cell multiplication to separate from each other as soon as possible, in order to expose the whole of their surface to the water Cell aggregation, the first step toward higher organization, is therefore disadvantageous to the pelagic plants" Hence it comes about that we find to-day, upon the surface of the ocean, myriads of primitive forms that are undoubtedly the exact replica of forms that existed millions of years ago at the very dawn of life. It was not until some of these forms migrated to the sea floor, and later to the dry land, that aggregation and differentiation gave the first impetus to progress "The pelagic plant life of the ocean has retained its primitive simplicity *on account of the very favorable character of its environment*, and the higher rank of the littoral vegetation and that of the land *is the result of hardship*."[2]

[1] W K Brooks *Foundations of Zoology*, p 225.

[2] Brooks, *op cit*, p 224 (italics mine) Cf also p 219· "A lingula is still living in the sand bars and mud flats of the Chesapeake Bay under conditions which have not effected any change in its structure since the

Passing over the long ages that elapsed between these first steps in progress and the appearance of the human species, it is still apparent that the same principle is operative. The highest types of human development in the earliest times of which we have record were not found in the most favored environments. The influence of the desert upon civilization has often been noted. The great river valleys of the Nile and Euphrates were the seats of ancient civilization, not from accident, but because the constant struggle with the encroaching desert brought out, selected, and developed those characteristics that we identify with human progress. Mere brute strength and brute cunning were not adequate to meet the conditions of life. Agriculture must be depended upon for food, and under desert conditions successful agriculture means a high degree of intelligence. In the struggle for survival under these conditions, a premium was set upon mental rather than physical prowess, and the forms of life that lacked intelligence were swiftly eliminated.

Under more modern conditions, we find that the highest types of human progress are represented by races inhabiting the temperate zones, where men must consciously struggle during the summer to provide food and shelter and clothing against the coming of the winter. The survival of the fittest in such an environment means a survival of the intelligent, the industrious, the temperate. It means the selection and perpetuation of those that can look ahead, that can hold a remote end clearly in mind, that can sacrifice the desires and impulses of the moment to the duties of the future.

How far is this principle to be carried? Is one to say that the chances for progress always bear an inverse ratio to the superficial advantages that an environment affords? If this

times of the Lower Cambrian. . . . The everlasting hills are the type of venerable antiquity; but lingula has seen the continents grow up, and has maintained its integrity unmoved by the convulsions which have given the crust of the earth its present form."

were true, the frigid zones should be the seats of the highest type of civilization, and the best type of individual manhood should consistently arise from the gutter. Certainly a line must be drawn at some point. Somewhere between the privation and discomfort of the Polar regions and the ease and luxury of the tropics there lies an optimal zone for progress; and somewhere between the idleness and caprice of the favored child of fortune and the sodden, ceaseless, mechanical drudgery of "The Man with the Hoe," there lies the optimal zone for individual achievement. "A favorable environment in any case is not one free from struggle, but rather one in which the organism is victorious in its conflicts, and in which the victory is not bought at too great a price."[1]

To summarize. Despite its weakened capacity for variation, the human species possesses two characteristics that place it far in advance of all other animal forms in so far as its chances for improvement over past conditions are concerned. (1) Man has the capacity to profit by his own experiences; and (2) the additional capacity to profit by the experiences of the race. The higher animals share with him the first capacity to a limited extent; the second capacity is his alone. *It is the prerogative of man to transmit to his offspring acquired characteristics.* An experience that modifies adjustment certainly gives rise to an acquired characteristic. Knowledge is race experience. Knowledge is the greatest and most potent of all acquired characteristics.

10. These two capacities, which mean so much to man,

[1] L. F. Barker: *American Text-book of Pathology*, Philadelphia, 1901, p. 18 (preface).

are both dependent in very large degree upon the power of speech. That this is true with the capacity to profit by the experiences of others is obvious enough. That it is equally true of the capacity to profit by individual experiences must be left for later demonstration.

11. *Education may be tentatively defined, then, as the process by means of which the individual acquires experiences that will function in rendering more efficient his future action.* The life of the individual is limited: give him no guidance and each generation must practically repeat, step by step, the life of its predecessors. The only chance for improvement would lie, as with the lower animals, in the ability to change the habitat or in the proclivity to congenital variation. When, however, the individual has at his disposal not only his own experiences and those of his lineal predecessors, but, with both these, the experiences of his contemporaries and of his ancestors' contemporaries, the equipment that he possesses for his struggle with the environment is far and away superior to that of any other animal, and his chances for improvement and progress are far greater. It is hardly too much to say that education is the largest word in the vocabulary of life, for it symbolizes all those forces that have raised man from the plane of the brute, all those characteristics that differentiate him from the speechless anthropoid, the *Homo alalus*, with which, not so very long ago, he was to be identified.

CHAPTER II

THE FUNCTION OF THE SCHOOL

1. IF the tentative definition of education with which the last chapter closed is valid, it follows that the acquisitión of any experience whatsoever that serves to modify future adjustment is an educative process. One is perhaps apt to think of education as confined to the school, or, at most, to the school and the home. This is manifestly a narrow view, and one that has done much to create in the popular mind an antithesis between education and life. Throughout the years of childhood, at least, there is very little that the individual does that is without some effect upon his future adjustment. It is therefore well to divide educational forces into two classes: (*a*) *informal* education, embodying those modifying influences to which every individual is subjected in varying degrees, and (*b*) *formal* education, embodying the modifying influences the control of which is consciously assumed either by the individual himself or by some educative agency, such as the school, the home, or the church.

(*a*) *Informal education* is symbolized by the common saying, "Experience is the best teacher." It would

appear from the previous discussion that this statement is a palpable truism, for when education is reduced to its lowest terms, experience is seen to be the only teacher. What the phrase is intended to convey is this: experiences that are gained incidentally in the course of the individual life are much more effective in modifying adjustment than experiences gained formally for this express purpose. Stated in this way, the proposition involves an assumption that schools and teachers are inferior in efficiency to the educative forces of practical life. That this proposition is generally valid can scarcely be doubted. "The burnt child dreads the fire" much more effectively than the child who is carefully instructed that the fire will burn him. A youth will assimilate a greater number of useful experiences in a bank than he will in a commercial school. In general, the experiences that issue from "practical" life will have a more lasting effect and will function more effectively than the experiences gained in school. The truth of this statement is self-evident. The reason that lies behind it, however, reveals an important lesson for pedagogy which must be left for later discussion.

Notwithstanding its unquestioned advantages, however, informal education has some marked limitations. (1) It is unsystematic: it fixes only the experiences that happen to come, and makes no provisions for experiences that may not be presented until adjustment has come to move in fixed channels; until the bodily

tendencies are firm and stable, and hence insusceptible to ready modification. (2) It is uneconomical: it leaves out of account the mass of experience that the race has acquired, and thus virtually leaves unutilized the capacity which man alone possesses to profit by the experience of others. If the child had a life as long as that of the race, and if he remained in a plastic stage throughout this period, we might well leave him to work out his own salvation. In short, the phrase, "Experience is the best teacher," is not nearly so profound as the qualification that is commonly added, "Experience is the best teacher, *and also the dearest.*"

(*b*) *Formal education*, then, while it labors under certain inherent disadvantages, is seen to perform an indispensable function in life. It does not leave the child to the haphazard operation of natural forces, but sees to it that he assimilates, whether he will or no, those experiences which, it has learned, will help him the most. It may place him in environments where such experiences cannot fail to be gained, or it may simply transmit to him the experience of the race through the medium of language. In either case, its function is selective and in this sense it is a formal — even an artificial — process.

2. The fundamental agency of formal education is the family. It is true that family life affords numberless opportunities for education of the informal type, but, essentially, the atmosphere of the home is dominated by a conscious purpose to bring the child into harmony

with whatever degree of civilized life the home may represent. It is here that the first steps are taken away from the animal, away from the brute. Carefully and patiently the habits of personal cleanliness and decency are inculcated — in part through imitation; in part, too, by conscious instruction involving the correction of mistakes, the serial repetition of trial and error, the positive and conscious setting up of models of speech and deportment for conscious and painstaking imitation. And beyond this is the impressing of the ideals of morality and religion and the very fundamentals of that national or race ideal that draws its nourishment from the home as the unit of all human society. "At all stages of educational history," says Laurie,[1] "the family is the chief agency in the education of the young, and, as such, it ought never to be superseded."

In the most primitive forms of human society, the home is the sole agency of formal education, involving, in addition to the fundamental functions just mentioned, conscious instruction in whatever crude arts of hunting and warfare the adult members of the family may practice.[2] Among many primitive tribes, it is true, this education of the home or family is supplemented at the onset of adolescence by different types of initiatory ceremonies which serve, in some measure, as a medium of formal instruction undertaken by the community rather

[1] S. S. Laurie: *Pre-Christian Education*, New York, 1900, p. 6.

[2] T. Davidson: *History of Education*, New York, 1900, p. 20.

than the family;[1] but this would seem, in the majority of cases, to be more in the nature of a religious rite than of an agency of formal education; that is to say, it is determined by custom and precedent rather than by a conscious purpose to bring the child into harmony with the tribal institutions, although there can be no doubt that it serves, in a measure, to fulfill this latter function.

3. Passing from the stage of savagery to the stage of barbarism, a differentiation of the educative function is first to be found. "The barbarian, as distinguished from the savage stage of culture, begins at the point where men learn to control natural forces — fire, water, wind — and to apply them directly to the satisfaction of their desires."[2] With this progress in culture comes a division of labor. Social life, before unsettled and perhaps nomadic, becomes relatively fixed and permanent. The home retains its fundamental educative functions, but the training in the primitive arts of hunting and warfare gives place to a more thorough training in special trades — a training, moreover, not necessarily confined to the home. As the crafts of rudimentary civilization became specialized, the masters in these crafts undertook the education of "apprentices," and "guild" instruction forms the first type of conscious or formal education outside the family.[3]

[1] J. Deniker: *The Races of Man*, London, 1901, pp. 241 ff.; see also A. H. Daniels: *The New Life*, in *American Journal of Psychology*, 1893, vol. vi, pp. 61–106.

[2] Davidson, *op. cit.*, p. 25.

[3] Davidson, *op. cit.*, p. 26.

With this division of labor there also arose the social castes, — priests, soldiers, producers. Of these the priests became the conservators of whatever race-experience had been concentrated or condensed into the forms of knowledge. It was their duty to interpret, to explain, to forecast. Knowledge, or the past experience of the race, however crude and inadequate, however heavily overlaid with superstition and mystery and speculation, became the tool with which they worked.

Davidson[1] points out that, just as the discovery of fire laid the basis for the arts, so the discovery of writing laid the basis for science. With writing came the preservation of knowledge in relatively fixed and permanent forms. Hitherto the medium of social heredity had been oral discourse. The race-experiences shaped themselves into myths and legends, epics and sagas; and wandering bards, of which Homer is the type, scattered broadcast the crude and primitive wisdom thus represented. But with the advent of writing this medium of transmission gradually lost its place.[2] With the advent of writing, also, education assumed a new significance. The priestly caste still further monopolized the prerogatives of learning; education came to mean still more the assimilation of knowledge rather than the acquisition of experience. The temple became a school.

[1] Davidson, *op. cit.*, p. 28.

[2] But oral transmission was not so inefficient as we seem to think to-day; see E. B. Tylor: *Anthropology*, New York, 1896, ch. xv.

A new type of formal education, centering in books and neglecting all arts save those concerned with language, became a fixed and permanent function of religion.

4. How the modern school gradually developed from this educational appendage of the church, the history of education relates. For centuries only partially differentiated from the priesthood, schoolcraft finally secured an independent footing in the division of labor. Still more gradually it came to concern itself with the practical as well as the theoretical, with the arts as well as the sciences. This has been at best only a very recent development and the full fruition is not yet; but education as concerned with all conscious and purposeful modifications of adjustment through experience is coming to be recognized as the true function of the school. No longer limited to the realm of the intellectual and "abstract," it touches life at all points. This conception is both narrower and broader than that which it is displacing so rapidly. It subordinates the ideal to the practical; it sacrifices science to service and truth to life. But on the other hand it idealizes the practical, rationalizes service, and enriches life. It involves serious dangers as well as undoubted blessings, but if the dangers can be counteracted, the movement assuredly augurs well for the future of the school.

5. One further point remains to be considered in connection with the function of the school. As an agency of formal education, its field is largely limited to the

period of individual immaturity, — the so-called "period of infancy," and to understand the function of the school one must grasp in some measure the significance of this period to human evolution.

The biological meaning of the helplessness and dependence of infancy has been fully recognized only in recent years. While some of the Greek philosophers hinted vaguely at its function,[1] it is to John Fiske that the credit must be given for endowing education with what is perhaps its most illuminating conception.[2]

(*a*) In the first place, *infancy is a period of necessary dependence.* The child lives what might well be termed an artificial life — a life where everything is provided for him, where he has to take no thought of food or shelter or clothing, where responsibility is borne by other shoulders. This means that the energy which would, under other conditions, be devoted to procuring food and clothing and providing shelter is available for other purposes.

(*b*) In the second place, *infancy is a period of plasticity.* The lower animals are born with nerve connections already fixed and, except in the higher vertebrates, comparatively permanent and stable. In the nervous system of man, the entire cerebrum is practically unorganized at birth. It is a mass of latent possibilities, and whatever connections are made later are due almost

[1] Cf. E. G. Burnet: *Early Greek Philosophers*, London, 1892, p. 74; cited by Chamberlain.

[2] J. Fiske: *Outlines of Cosmic Philosophy*, London, 1874.

entirely to the forces of the environment and not to the forces of heredity. But these connections, once made, also tend in the course of time to become permanent and somewhat inflexible. That is, after a certain plastic period the nervous tissue loses some measure of its plasticity. While it is still possible to learn new adjustments, — to acquire and profit by experiences, — after this time the task is much more difficult.[1]

The meaning of infancy is, therefore, economic leisure — freedom from the responsibilities of food-getting and self-support — and organic plasticity. Curiously enough, the Greek equivalent of the English word "school" — *schole* — also means leisure. Because the child *must* be supported by the labor of others during this period, he can utilize his time and energy for remote rather than immediate ends; he can store up experiences for future years. Because his body, and especially his upper nerve centers, are in a plastic condition, the experiences that he acquires at this time can most easily make a deep and abiding impression. "A comparatively witless infancy must augur the high intellectual development of the men and women of the race. What a vast difference between the

[1] The significance of human infancy as a period of plasticity has a close parallel in the lower animals. J. B. Watson (*Animal Education*, Chicago, 1903) has shown that the mental development of the white rat is directly correlated with the medullation of fibers in the central nervous system after birth. Similar studies made by Jessie Allen on the guinea-pig (*Journal of Neurology and Psychology*, 1904, vol xiv) show that medullation is complete at birth, and that the guinea-pig *never equals the white rat in adjustments involving intelligence.*

amœba at the beginning of the animal scale and the human infant at the top! There parent and offspring are practically one, with no immaturity and no need of education. And between the two lie all varieties of animal life, with ever increasing complexity of structure and intelligence in the adult, and ever lengthening infancy and childhood in the offspring."[1]

6. *The school, then, is a specialized agency of formal education which aims to control in a measure the experiences of the child during the plastic period of infancy.* It must be repeated, however, that education is not limited to the school. Wherever one individual learns from another how to better his life, how to meet more successfully the forces that oppose him, how to assimilate race-experience and profit by it — there an educative process is going on whether there be a school or not. And more than this: wherever one individual learns from his own experiences how to adapt himself more adequately to future situations, there an educative process is going on, whether there be a teacher or not. The education by the family up to the period of school instruction, the education by the family and by society during this period and afterward, the education of the individual in the "school of experience" — none of these factors can be neglected. But while one recognizes this truth, one must also recognize that the school demands the largest share of attention and study, not because it influ-

[1] A. F. Chamberlain: *The Child*, London, 1900, p. 3.

ences the child *more* than any of the other forces, — home or society or life, — but because it is more amenable to control. It is through the school that the future of the race can be influenced with the greatest certainty. The factor of parental education is quite invariable; the same ends are sought and the same methods employed generation after generation. The social factor and that designated by "life" are, on the contrary, ultra-variable, possessing so little stability that, notwithstanding their profound influence, their results can never be predicted with certainty. The school lies, therefore, between these two extremes as the one factor that is within our control in an appreciable degree.

This last proposition may demand evidence. After all, can the formal education of the school make a lasting impression upon the social body? Can a powerful educator of to-day so direct the forces at his command as materially and tangibly to influence the future condition of society? These questions can be answered in but one way — by an appeal to educational history.

That of China is a case in point No other country is so thoroughly imbued with the spirit of formal instruction; in no other country have the power and influence of an elaborate educational system been put to so adequate a test. It is, as it were, an experiment made to hand. The Chinese character as it stands to-day is the result of a selective process that has been going on for centuries, tending to preserve and promote the non-progressive ideals of the past, and tending by the same token to eliminate the variations from the established stock. The work of the Chinese schools and schoolmasters, crystallized as it is in memoriter drills of the most formal kind, has given its characteristic features to the race ideal.

ational history of England furnishes a parallel case. almost half a century since Herbert Spencer published ys on "Education," in which, almost with the vision of ophet, he predicted the effect which the hypertrophy of assical instruction would have upon the English people. He pleads for more science in the schools and universities. "Just as fast," he says, "as productive processes become more scientific, which competition will inevitably make them do; and just as fast as joint-stock undertakings spread, which they certainly will, just so fast will scientific education become necessary to every one. . . . All our industries would cease were it not for that information which men begin to acquire as best they may after their education is said to be finished. And were it not for this information that has been from age to age accumulated and spread by unofficial means, these industries would never have existed."[1]

It is a matter of commonplace knowledge that Spencer's prophecy has "come true," and that England is reaping, in vanishing markets and a decay of commercial prestige, the fruits of her neglect of scientific instruction. Yet, even now, she only hesitatingly acknowledges that the cause of her industrial decline must be laid at the door of her short-sighted educational policy.

China and England offer evidence of a negative character. Japan and Germany offer evidence of a positive character, and this is all the more convincing because each offsets a people of its own race, thus eliminating any factor that might be urged on the ground of "constitutional tendencies."

It is not necessary to dwell upon the marvelous change that has been wrought in the Japanese people within the last half-century. Almost in a generation the character of the race has been transformed. Nor can there be a doubt that formal education has been a large factor in this change. The compulsory

[1] H. Spencer: *Education*, New York, 1895, pp. 53 f.

public school system, the liberal endowment of universities and schools of technology, and the state support of native students in foreign lands have all contributed their share to the material prosperity of the empire. Education in Japan is a "business" proposition, not a mere matter of precedent and custom; and, although it is an expression of a new and vigorous national ideal, it is not "sentimental" in the sense that the ultra-effeminized school system of the United States deserves that opprobrium.

Germany's contribution to the discussion is even more convincing. At the close of the Napoleonic wars, Germany's condition was almost hopeless. Politically and industrially, she seemed to be upon the verge of disintegration. At this critical juncture, Prussia took up Pestalozzi's scheme of a public, universal education — the same comprehensive plan that Napoleon had dismissed with a sneer. In two generations education had transformed Germany from the weakest to the strongest nation on the continent of Europe; and when Von Moltke received the capitulation of Paris at the close of the Franco-Prussian War, he gave the credit for the triumph to the schoolmaster. The insult that Pestalozzi had suffered at the hands of Napoleon could not have been more fittingly wiped out. Nor is Germany's industrial supremacy to-day less due to educational factors than was her political supremacy in 1871. It is a commonplace that she owes her virtual command of the world's markets to her high-grade technical schools. Just as the schoolmaster won the Franco-Prussian War, so the schoolmaster, aided by the professor of chemistry, has triumphed in industrial competition. In view of these facts one can scarcely marvel that the education of the German people is not intrusted (as it is in some other countries) to "immature women and feeble men."

7. Every now and again the old question, "Is heredity more influential than environment in determining character?" is raised in a new form. It is a world-old

query that will probably never admit of a universally valid answer. It offers a choice between fatalism and hope — and the enlightened nations of the earth are annually staking millions of dollars on the side of hope.

It is certainly true that individuals vary in tendencies and aptitudes, and it is certainly true that many of these differences are due to hereditary conditions; yet it is generally agreed among anthropologists that, *in the large*, the factor of heredity plays a very small part in human life as compared with the factor of environment. It has already been suggested that hereditary factors have been largely replaced in man by environmental factors because of the higher survival value that attaches to the latter; that instinct has degenerated; that the reflexes with which the infant is provided at birth are much less efficient and much less highly organized than in the lower forms. Nature is not lavish with her gifts; she refuses to expend energy needlessly; she refuses to supply luxuries that have no purpose.

And just because the factor of environment is all-important in human life, education, which simply represents the rational employment of this factor, is all-influential. The school is only an institution for providing environments, for regulating environments, for turning environmental forces to a definite and conscious end.

Each subject of the school curriculum represents a certain specific attitude toward the world about us — represents a certain specific phase of experience with the environment.

From the standpoint of mathematical science, the arithmetic of the schools comprehends the principles of number; from the standpoint of education, arithmetic is one expression of our attitude toward our surroundings. Number is one of the ways in which we interpret the environment, one of the methods by means of which we subdue it and turn its forces to our own ends.

Geography is a study of the environment in the concrete; it treats of the earth as the home of man. And the natural sciences, from this point of view, are but abstractions from the comprehensive field that geography covers, — botany dealing with the world of plants, zoölogy with the world of animals, geology with the world of inorganic matter, meteorology with the world of air, and so on. Physics represents still another phase of our surroundings, — our experience with the forces that operate upon material bodies. And chemistry and astronomy represent still other types of experiences that result from our contact with the external world.

The world of man is just as real and tangible as the world of matter, and the human sciences represent our experiences with the social environment, just as the natural sciences represent our experiences with the physical environment. History relates the experience of different races amid diverse surroundings; it is a record of reactions and adjustments; it is experience in the concrete. Sociology is experience with the social environment, condensed into principles and organized into a system. Politics is only a certain phase of sociology, representing experience with a limited sphere of social activity.

Nor are the mental sciences to be excluded from this list. Psychology is the science of experience itself, — the experience of experiences, to put it awkwardly but truthfully. Ethics and æsthetics, logic and epistemology, are but specific phases of the larger field of psychology, much as physics and botany are abstractions from the larger field of geography.

Throughout the curriculum of the school, then, each of the various branches of knowledge really represents a certain type of experience with a limited phase of the world about us or within us. It is one duty of the school to impart this experience to the child. "It should not be forgotten," says Professor Howerth,[1] ". . . that one function, if not the function of our school system, is to distribute amongst the members of society the most important knowledge that has already been collected."

But the school has another function. Education means not only the assimilation of race-experience but the acquisition of individual experience as well. The school must provide for the child certain environments, reaction to which will give him experiences that will be serviceable to him in later life. This is the phase of education that is just now coming into prominence — so rapidly, indeed, that Professor Howerth very pertinently warns the teacher that the side of knowledge or race-experience must not be forgotten. It has been mentioned earlier in this chapter as a recognition of the arts as well as the sciences, of doing as well as knowing, of action as well as thought.

How these two functions may work together harmoniously will be the theme of a later section. One further problem still remains for consideration in connection with the present discussion. It has been said that the school is an institution for providing environments,

[1] I. W. Howerth, in *Educational Review*, 1902, vol. xxiv, p. 161.

for regulating environments, and for turning environmental forces *to a definite and conscious end.* What this end is and what it should be are questions that demand a treatment far more comprehensive than the following chapter can attempt.

CHAPTER III

THE ETHICAL END OF EDUCATION

1. THE question now presents itself: Upon what basis shall the school, or any other agency of formal education, select the experiences that are to function in modifying adjustment? To what end shall adjustment be modified? Shall the school attempt so to organize the reactions of the individual that he may be able to earn a respectable livelihood? If so, it must first determine what experiences will best subserve this end. Or will its ultimate aim be to develop "moral character," as the followers of Herbart maintain? In this case, it is possible that a different set of experiences must be chosen. And so one might go on through the entire list of educational aims.

2. It seems tolerably clear, however, that the laws that underlie the educative process are largely independent of the ultimate end of education. The particular problem with which this book is concerned is *how* experiences shall be impressed in order that they may function effectively in modifying adjustment. Whatever the ultimate end of education may be, the acquisition, the retention, the organization, and the

application of experiences are subject to certain uniform laws. The ultimate end may vary and has varied from race to race and from generation to generation; but the fundamental processes are based upon the relatively constant factors of mental and physical activity and growth. The ultimate end of education in the public school, for example, will doubtless be vastly different from the aim of Fagin the Jew in his training of Oliver Twist. Yet the methods employed in both cases may be based upon identical principles. In either case the child is subjected to certain experiences that are planned to modify his future adjustment; in neither case is this adjustment left to the blind control of inherited impulse.

3. At the risk of multiplying terms needlessly, it may be profitable to discriminate between aims of education in this way: the aim or purpose or function that was discussed in Chapter I may be termed *empirical*, while the ultimate or final aim may be termed *ethical*. It is the empirical aim of education to fix experiences that shall modify adjustment. It is the ethical aim to fix those experiences that shall modify adjustment with reference to a certain definite end; those experiences that will make the individual a moral agent, or enable him to earn his own livelihood, or, perhaps, enable him to steal successfully. Dynamite explodes in the same way, — according to the same laws, — whether it is used as a harmless blast in a mine or to deal death and destruction at the will of an anarchist. Similarly, the

principles of educational method work in the same way whether they are to produce a theologian or a thief.

The advantage of this distinction between empirical and ethical aims of education will be apparent to all who have been distressed by the cry of certain critics to the effect that education can never become a science, because, forsooth, educational ideals are in continual *flux*, and the truth of to-day may be the falsehood of to-morrow.[1] As well say that physics can never become a science because there is nothing in the law of gravitation that will indicate with certainty whether a criminal or an innocent man is to be hung. A great many problems of educational practice can be solved only by recognizing a definite end of education. These problems are concerned mainly with the course of study, — the "educational values" of different items of the curriculum. Will science develop bread-winning capacity better than history? Will history develop moral character more effectually than science? Here the ultimate aim is obviously important. But these questions once settled, there still remain the detailed problems of method. Granted that science represents the experience that will best subserve our ultimate purpose, how shall the individual be subjected to this experience? How shall we insure that the knowledge will be assimilated and retained and applied? This is the practical problem of method, and the problem that the great rank and file of teachers must solve. They have little to do with the determination of educational values or with the structure of the course of study.

4. True as this is, it must not be inferred that the average teacher need take no account of the ethical

[1] Cf. Professor O'Shea's rejoinder to Dilthey's assertion that education can never be admitted as a science because its generalizations do not have universal validity. M. V. O'Shea: *Education as Adjustment*, New York, 1903, pp. 11–13.

aim of education. While the principles of method may be independent of aim, just what method is to be employed by the teacher in a given instance may depend entirely upon the purpose that he seeks to accomplish. While dynamite may either blast a rock or kill a king, the miner or the anarchist may decide that, after all, gunpowder is better suited to his purpose. And while the direct method may enable the child to assimilate a bit of knowledge, the teacher may conclude that, for his purpose, the indirect method will answer as well or better. In short, while it would be possible to construct a science of educational method in which the ultimate aim of education should be entirely neglected, the value of such a structure would certainly not be impaired and might, for some purposes, be greatly enhanced if a definite aim were assumed. The principles that we shall present in the following chapters are, in the main, general principles valid in any particular case; but it is safe to assume that no one will care to apply them to the development of thieves and murderers; and inasmuch as a definite assumption of an ethical or ultimate aim may serve to render our discussions more vital and less abstract, it may not be amiss to state this assumption at the outset; remembering, of course, that, even if it is not accepted by all as the true end of education, the larger principles which it is used to illustrate will not suffer thereby.

5. The ultimate aims that have been proposed for

education are as numerous as educational theorists, consequently their name is legion. It would require a volume of no small dimensions to discuss in a critical manner even the more important. We shall therefore limit ourselves to those that have had the greatest influence in shaping contemporary educational policy. These will not necessarily be the most profound, but rather those that have appealed most effectively to the popular mind.

(*a*) *The "Bread-and-Butter" Aim.* That education (in the popular sense of the term) may enable an individual to earn a livelihood is the motive that impels perhaps the great majority of parents to send their children to school. It may be well to qualify this assertion by adding, "The great majority of parents *who think about the matter at all;*" for here as elsewhere the powerful factor of social imitation must be taken into account: the child is sent to school because the school is there, and because other parents send their children to school. But of those who have a deliberate purpose in mind it is highly probable that the impelling motive of the majority can be reduced to the "bread-and-butter" type.

It is the habit among educators to lament the prevalence of this aim — to lament especially the sordid and purely individual spirit which it commonly reveals. Yet it may be said in its favor that the motive is not merely to enable the child to obtain a livelihood, but

to obtain a better livelihood than would otherwise be possible, — a better livelihood, it may be, than his parents have been capable of procuring. This signifies a desire for improvement, for advancement, and as such it is surely commendable from any standpoint. That this improvement should be measured in dollars and cents is due to the universal significance of the monetary standard of value. In truth, improvement in the conditions of life can undoubtedly be more accurately and definitely measured by this standard than by any other. That the motive is individual is not wholly to be deprecated; that is to say, such an aim, even though individual, is not necessarily unsocial; for, within certain limits, individual advancement means social advancement.

The chief virtue of the bread-and-butter aim is its definiteness. There is nothing vague or intangible about the criterion that it sets up. But, notwithstanding this advantage, it involves a grave source of danger in the mental attitude that it encourages — a danger that lies, not in its objective results, but in its subjective tendencies. In other words, it breeds a narrowing spirit and thus tends, in a measure, to defeat its own ends. With its rigid adherence to processes that have been tried and tested by its own standards, with its unwillingness to accept a process the practical value of which is not evident upon the surface, it may miss many a golden opportunity to further the very purpose which

it sets out to accomplish. The parent who objects to a "liberal" education because he thinks it impractical may see his son outstripped in the race of life by men who obtained the liberal training with little or no thought as to its effect upon their earning capacity. The "bread-and-butter" philosophy everywhere pays the price of short-sightedness for the virtue of practical utility. In the economy of nature one cannot be both broad and narrow at the same time.

6. (*b*) *The Knowledge Aim.* This may be looked upon as the practical antithesis of the aim just discussed. Each is the expression of a popular philosophy: the bread-and-butter aim representing the practical, work-a-day view of life, the knowledge aim reflecting a view of life that would minimize its material expressions and emphasize the ideal; the one representing the life of struggle, the other representing the life of leisure.

But the knowledge aim and the bread-and-butter aim, contradictory as they may seem in theory, may not work inharmoniously in practice. If we look upon knowledge as that part of race-experience that has been preserved, it would seem reasonable to believe that this preservation has been, in large measure, determined by practical standards. That is, the body of knowledge is made up of facts and laws and principles that are, or have been, in one way or another, valuable from the standpoint of utility. From the operation of natural law there is no ultimate escape, and the survival of the

useful with the consequent elimination of the useless works *in the long run* as relentlessly in the field of mind as it does in the field of matter. It is assumed, of course, that those who support the knowledge aim conceive of knowledge in this way. If, however, the knowledge aim measures the value of experience merely by conventional standards, the case is entirely different. We shall revert to this point under the discussion of the "culture aim."

With the knowledge aim as thus interpreted, the danger lies, as in the bread-and-butter aim, not in the nature of the objective results, but in the nature of the subjective tendencies. The hoarding of facts for their own sake is somewhat akin to the hoarding of gold. Both tend to develop the mental attitude of the "miser." In either case the objective results may be the same as they would be were the individual abstemious and industrious from other and broader motives; but from these results must be deducted the negative factors that are involved in an unsocial and abstract point of view; so that, in the ultimate analysis, the net result may be vastly different. Or, to put it in another way: to assimilate experiences merely for the sake of the experiences does not prevent the individual from utilizing them afterward; but the fact that he does not, in the first place, look upon the experiences as something primarily to be used, may interfere with their maximal efficiency in application.

7. (*c*) *The Culture Aim.* Closely connected with the knowledge aim is that which proposes "general culture" as the end of education. In the latter case, however, knowledge is to be acquired, not for its own sake, but because tradition has developed certain standards of culture which imply the acquisition of certain items of knowledge, — the assimilation of certain conventional experiences. It is not necessary that these should have a definite application to the problems of life except that they give the individual prestige among his fellows. To be able to read Latin was once the *sine qua non* of the student. Before the tongues of Europe had become organized and efficient means of preserving and transmitting experience, one who desired acquaintance with the wisdom accumulated by past generations must have had recourse to the Latin language. And so it came about that Latin formed the central feature of formal education at a time when the schools of modern Europe first began to take definite shape.

In the course of organic evolution, structures persist long after they have outlived their usefulness. In the brain, the epiphysis represents the last vestiges of a once-functioning eye. In the muscular system, the recti of the ears once had a definite and useful purpose. In the digestive tract, the vermiform appendix is an atrophied and now useless and cumbrous remnant of an organ that still functions in some of the lower forms. And so it is with human customs: they persist long after

their original function has been outgrown. Many of the so-called culture studies have little or no practical utility under present conditions. They represent, in other words, experiences which the individual has very little occasion to apply to existing problems of life. Yet they remain a part of the curriculum of the schools, and in many cases they dominate the curriculum. They are condoned and justified in various ways — some of the attempts to justifiy their continuance being so labored and involved as almost to appear ridiculous. The real reason for their persistence, however, is that they represent, especially in ultra-conservative countries like England, "the things that a gentleman must know," which is only another way of saying that they give a man the earmarks of gentility, — certain habits of thought, certain tricks of speech, that serve to differentiate him from the ungentle.

Happily the elementary school has developed with little reference to this standard, as, obviously, a system of education supported from the beginning by the people at large must have developed. So much cannot be said, however, of the public high and secondary schools. That such institutions are still largely dominated by this conventional factor and are, in this regard, totally subservient to the colleges that receive but the merest fraction of their graduates, is a commentary upon the snobbish tendencies which a democracy may inherit from older forms of government.

There is a more or less prevalent theory to the effect that the school is a powerful agent in molding public opinion. That it can become a powerful agent, the facts brought out in the last chapter seem to prove. But that the school generally follows rather than leads is a fact which a survey of conditions, especially in Anglo-Saxon countries, cannot fail to impress. Where the school has become a force, it has been largely in virtue of arbitrary rulings, as in the case of Germany or Japan. In democratic countries its policy is usually determined by external factors, — prejudice and custom in England, prejudice tempered by economic conditions in the United States.

The conservatism of formal education is inherent in its very nature. It is firmly rooted in the past, because race-experience, or knowledge, with which it is so largely concerned, is a product of the past. At the present time the importance that attaches to natural science — in itself essentially modern — may lead us to underrate this tendency; but generations hence, after the stage of crystallization has set in, its full effects will again be plainly apparent.

8. (*d*) *The Harmonious Development of All the Powers and Faculties of Man.* In spite of its apparent comprehensiveness, the insufficiency of this aim is evident at a glance. The word "harmonious" is the disturbing factor. If "complete" or "maximal" development were desired, the situation would be materially simplified. But no one could, in common sense, demand the complete or maximal development of all the capacities of the individual, although not a few have, in theory, supposed such a miracle possible. The man who can do all things equally well; the man who is master of all arts, and at the same time an authority in all fields of

knowledge; the man who works equally well with head and hand, with pen and pencil, with brush and chisel; the man who is poet and plowman, orator and artisan, financier and philosopher, all in the same breath — this man exists only in the pages of fiction or in the fantasies of the dreamer. It may be possible to develop all the faculties *equally*, but not *maximally*. Here the relentless law of compensation interposes an emphatic veto.

But suppose "harmoniously" to mean "equally" — what, then, shall we say of this aim? Common sense supplies the answer. You may find the legitimate product of such a view of education in every crossroads village. He is known as the jack-of-all-trades, and the veriest schoolboy will tell you that he is good at none. In art and literature, he is the dilettante; in business, he is the "general utility man"; in professional life, he is the pettifogger. You will find him everywhere — the man who can turn his hand to anything, and do nothing well. Society needs some of these men, but society does not need a system of education that is designed to turn them out in quantity. The office will never be vacant, whatever system of education prevails.

The harmonious development aim works some very curious results when put into practice. Here is a capacity, it says; Nature has provided it, hence it is our duty to develop it. The fallacy of this syllogism is that of *non sequitur*. Because the capacity is there is not a sufficient reason for its development. Every individual has a number of muscles and sets of muscles which may be developed. Acting upon this argument, every

bit of muscular tissue has its duty to perform, and should not be allowed to atrophy through disuse. This point of view neglects to take account of a very simple fact, — the fact, namely, that conditions of life are vastly different to-day from what they were when our bodies took their present form. Just as there are in mind certain tendencies that had a vital connection with primitive conditions of survival, — the tendency to do bodily harm to our enemies, to appropriate objects that give us satisfaction, regardless of the rights of others, — and just as in civilized life we not only let these tendencies atrophy, but help on the process as strenuously as possible; so there are in the muscular system certain sets of fibers that had a significance at one time, but the original function of which has long since disappeared. And if one is pressed for an example, it is easy to cite the rudimentary muscles that once wagged the ears of our remote ancestors. It were scarcely necessary to emphasize this point were not the contemporary philosophy of physical education so utterly naive.

The harmonious development aim has taken another erratic turn in giving undue prominence to "sense training," especially as applied to the lower senses, which are not at all acute in man. The rudiments, however, exist; *ergo*, they should be developed. Now the sense of smell has atrophied in man for a very good reason, — a fact for which one who lives under modern conditions should, in all conscience, be duly grateful. Olfactory acuteness was undoubtedly highly important at one period of race-development. Its function has, however, been almost entirely replaced by other factors, — by acuteness of vision and hearing in some measure, but more than this by the fact that intellectual acuteness is far more efficient than mere sensory acuteness. Intellectual acuteness, however, involves concentrated and sustained attention. Anything that interferes with such attention will interfere with intellectual efficiency. Like all the lower sensations, the sensations of smell have very marked affective qualities; they are either very pleasant or very

unpleasant; hence, they distract attention, — or, to speak more accurately, they compel attention to themselves. In the psychological laboratories, indeed, odors are looked upon as the very best distracting stimuli. It can be easily seen that, as sustained attention became more and more important in the struggle for existence, those senses that furnished distracting stimuli would be somewhat at a discount. Consequently the forms that possessed such senses would tend to be eliminated, and natural selection would gradually work toward a general atrophy of the lower senses, provided that they did not contribute definitely to the survival of the animal. Thus organic sensation, while even more highly colored with affection than the sense of smell, persisted because its function could not be taken up by anything else. Smell, however, was not in this class. Its functions could easily be taken over by intelligence, and consequently its utility was practically at an end. The rudiments still persist, and can be developed, although in no degree approaching their former acuteness. It is plain, however, that to spend time and energy in such development is simply to replace, as far as possible, a capacity that nature has done her best to eliminate.

We must also refer at this point to another vagary of the harmonious development enthusiast, — that, namely, which has reference to developing the "powers of observation," — meaning, as nearly as one can make out, the capacity to take notice of little things, and especially of external objects of which we obtain knowledge through the sense of sight. Without raising the question whether there is such a thing as a "general power of observation," we may admit that the capacity to note minutiæ in the visual environment may be improved through training. But even then, as we shall see later, this would probably be limited to specific features of the environment. The botanist would take note of minute details in plants, the geologist would note differences in earth sculpture and rock formation, the artist variations in color, etc.

Each of these capacities would doubtless be valuable to the person in question, and he would develop his special capacity in the course of his special training. For the average man, however, the habit of taking note of every little detail of his environment, even if it could be developed, would doubtless prove more of a curse than a blessing. Through long ages of selection, man has gradually acquired the capacity to concentrate — to neglect irrelevant stimuli and to sustain his attention over a consecutive line of thought. When Nature has done her best to eliminate the tendencies to distraction, why should we go out of our way to multiply them? And here, again, one might certainly accuse us of setting up a man of straw, were not contemporary educational theory so distressingly short sighted.

These cases may serve to illustrate how the harmonious development aim may work out in practice. That they are extreme cases is undoubtedly true, and yet they typify the mental myopia that characterizes so much of our educational philosophy. We seize upon high-sounding phrases without stopping to inquire, What does all this mean? And, if the matter ended here, the conditions would not be so discouraging. But the matter does not end here. For not only do we theorize blindly, but we apply our theories ruthlessly to our practice, tearing away the foundations that have stood the test of time, and replacing them with flimsy framework fashioned from unseasoned timbers. And when, through the operation of forces that we might have foreseen and calculated, our timbers shrink and warp and rot, we tear them out — only to replace them with others of their kind.

The harmonious development aim, as proposed in different forms by various educators, is thus seen to be deficient in two essentials definiteness and perspective. The term "harmonious" is strictly relative; upon its

further definition one's judgment of the aim must surely depend. It is not ultimate; the question, "Harmonious with what?" is still left open. We must have a still more remote criterion for the selection of experiences which are to modify adjustment. There must be a broader principle upon which our efforts are to be "harmonized."

9. (*e*) *The Development of Moral Character.* This aim of education stands upon a different basis from that just considered. It is certainly more definite to speak of the development of moral character than to speak of the harmonious development of an individual's capacities. Here, then, we have a possible ultimate principle: if the capacities of the individual are to be developed in harmony with a recognized standard of morality, then we at least have something tangible upon which to build. Having this standard definitely in mind, we can select the experiences that will most effectively accomplish our purpose. The difficulty lies in the fact that not all men agree as to what constitutes morality. Morality is a name; a definite meaning must be attached to the word before we can accept it as an ultimate principle.

Of those whose names are prominent in the philosophy of education, Aristotle and Herbart have, perhaps, most consistently argued for moral development as the end of education. Aristotle[1] finds in man two tenden-

[1] Aristotle: *Nicomachean Ethics*, ii, 5 ff.

cies: the one passionate and brutal, the other intellectual and human. The latter, he maintains, is the basis of morality and to develop it is the work of education. Thus morality, gained in part through education, is the conquest of brute passions, animal impulses, by what we may designate as intelligence. In the natural man, pleasures of the senses are the motives for conduct; in the moral man, pleasures of the intellect. The moral life becomes, then, a "golden mean" in which the material is governed by, but not sacrificed to, the ideal.

Herbart [1] looks upon education and morality in a similar light. "The true and whole work of education," he says, "may be summed up in the concept — morality." The most important characteristic of Herbart's conception of morality is the "good will." This he explains in the following words: "The good will is the steady resolution of a man to consider himself as an individual under the law which is universally binding. . . . If we think of the power, and resistance as well, with which a human being maintains this good will erect in himself against those movements of the emotions and desires working in opposition to it, then morality . . . becomes to us the virtue, power, action, and efficacy of the will so determined." Or, to put this clumsy and obscure proposition in another way, morality consists in the dominance of the lower and more primitive impulses

[1] J. F. Herbart: *Æsthetic Revelation of the World*, in *Science of Education*, trans. Felkin, Boston, 1893, p. 57.

("movements of the emotions and desires") by higher ideas; a point of view, it will be seen, quite similar to that of Aristotle.

This bold statement of the dependence of morality upon experience is Herbart's lasting contribution to the theory of education. It is only another way of saying that the child is not born a moral being, but attains to morality only after a long and tedious process of training — a process that is justly termed education. The Herbartian school of pedagogy has consistently built upon this principle, and it is hardly too much to say that the unquestioned success of this educational movement is most largely due to a clear conception of the fundamental truth here expressed. Whatever differences of opinion may appear in the theories proposed by the several followers of Herbart, there is unanimity of opinion upon the aim: moral character must be developed, and moral character can be developed only by a process of education. To this end all means are subordinate.

Although Herbart died more than sixty years ago, and although, like all other sciences, the science of ethics has been almost revolutionized by the doctrine of evolution, Herbart's conception of morality is, at basis, the prevailing conception to-day. What we commonly term moral action is the control of impulses that we have inherited from a long line of brute and savage ancestry. When we are hungry, the natural impulse would be to appropriate whatever article of food we chanced to see.

But if an impulse to take food belonging to another should enter consciousness, it would probably be inhibited by the idea that the food is not ours, that we have no right to it. Such is the type of moral action. As a matter of fact, we seldom practice this inhibition, because the tendency to respect the rights of others is so thoroughly ingrained upon our nervous systems that the primitive impulse seldom makes itself felt. Nevertheless, it has been education of one kind or another that has impressed this tendency to respect the rights of others. The "natural man" would not think for a moment of doing so. He would never have assimilated experiences that would lead him to modify impulse in this way. The distinction between Oliver Twist's education at the hands of Fagin and the education that the public school attempts to give, is a moral distinction. Both have equal rights to the term "education," for in both cases experiences are fixed for the definite purpose of modifying future action. But in Fagin's case the experiences were to modify action with reference to immoral ends, while the contrary is true with the education of the public school. We generally understand that when we select experiences for educational purposes, we have definitely in mind a measurable addition to the child's capital of character; and moral character is nothing more nor less that an *habitual and ideal bias toward moral action.*

10. (*f*) *The Development of the Socially Efficient Individual as the Ultimate End of Education.* The point

that Herbart and his followers have failed to emphasize is the social essence of morality. It is true that the social criterion is implicit in the Herbartian ethics, as, indeed, the same criterion is implicit in practically all ethical theories. There is an advantage, however, in using the term "socially efficient" in place of the term "moral." In the first place, it is more definite; in the second place, it emphasizes the social factor, and, inasmuch as the school is supported by society presumably for society's benefit, it is only right that this factor should find a definite expression in the aim of the school.

The equivalence of the terms "social" and "moral" has been stated rather dogmatically, and demands further explanation. It is clear that the inborn or brute tendencies which exist in man until he is educated away from them are, in reality, legitimate products of heredity. Yet they are in their essence purely individual, and make for the satisfaction of individual desires. They are opposed to everything that is social and altruistic But the conquest of these tendencies is universally agreed to be a process of moral development; while, from its very nature, it is also a process of social development The keynote of morality is self-denial, yet the very term "*self*-denial" implies the denial of self to others — the true essence of the social spirit.

The doctrine of evolution has revolutionized ethics, inasmuch as it has revealed the equivalence of the terms "social" and "moral." And in rationalizing ethics it has pointed out that self-denial, unchecked by the social criterion, may become as immoral as self-indulgence. It recognizes to the finest degree the delicate balance between the individual and society, in the neglect of which courage becomes foolhardiness, tem-

perance passes over into asceticism, enthusiasm engenders fanaticism, and virtue degenerates into vice. Morality means the control of impulse with reference to a social end; but this control assuredly defeats its own purpose when it completely annihilates impulse. Absolute self-sacrifice is the greatest of virtues only when it can be distinctly proved that the termination of the individual life will do more to promote social welfare than a continuation of the same life would accomplish.

The world has recognized this fact for ages. One man sacrifices his life in order to crush tyranny, and the world honors him as a martyr, another meets the same fate for the same reason, and the world anathematizes him as an assassin. Judged by subjective standards, each man's act merits the same reward. But the world does not judge acts by the subjective standards of the agent. It has an eye to its own welfare, and it dubs this man a hero and that man a rascal according as the deeds of each are consistent or inconsistent with this welfare. This view may be distasteful, but it is relentlessly logical. We may rebel against the apotheosis of society and the consequent sacrifice of the individual, but all the facts of nature range themselves against us. "It is a condition and not a theory that confronts us."

Social efficiency, then, is the standard by which the forces of education must select the experiences that are to be impressed upon the individual. Every subject of instruction, every item of knowledge, every form of reaction, every detail of habit, must be measured by this yardstick. Not What pleasure will this bring to the individual, not In what manner will this contribute to his harmonious development, not What effect will this have upon his bread-winning capacity, — but always, Will this subject, or this knowledge, or this reaction, or

this habit so function in his after-life that society will maximally profit?

11. The present chapter thus far has been largely a statement of opinion — largely speculative. The question of the aim of education is an ethical question, and, like all ethical questions, it seeks, not to establish facts, but to set up norms and standards. It implies a broad outlook, based upon a multitude of facts and theories; and the pressing problem is to hit upon a norm or standard that will be consistent with these facts and theories. We have still to continue for a brief space this general method of procedure. Social efficiency has been proposed as the ultimate aim of education. It now remains to state as clearly and explicitly as possible just what social efficiency means. This, too, will be largely in the nature of individual opinion. We cannot always wait for problems to be solved by the exact methods of science. If we could there would be much less theorizing in the world; but it goes without saying that existing conditions frequently forbid such delay. What we need in education is something definite to tie to. If this something be accurate and exact, so much the better; if it cannot be accurate and exact, let it approach this ideal as closely as possible, but in any case let it be definite. If we have a definite notion of what we are trying to accomplish, and if we realize that this notion is subject at all times to the changes that later discoveries may necessitate, we shall at least have a chance to make

some degree of progress and yet escape the danger that is incident to hasty generalization.

(1) That person only is socially efficient who is not a drag upon society; who, in other words, can "pull his own weight," either directly as a productive agent or indirectly by guiding, inspiring, or educating others to productive effort.

This requires of a socially efficient individual that he be able to earn his livelihood, either in a productive employment or in an employment where his energy will be ultimately if not directly turned into a productive channel. For example, the farmer, the miner, the fisherman, are all engaged in producing, in turning the products of nature to the needs of man; likewise the manufacturer who continues this process of conversion, the carrier who transports the products to those that need them, the tradesman who turns them over to the consumer. Indirectly, the housewife or the boarding-house keeper who maintains those that are engaged in productive labor is performing a necessary function in the productive process. Not less, though more indirectly, are the physician who keeps men at a maximal degree of productivity; the clergyman who does his best to free their lives from tendencies that would interfere with maximal productivity; the teacher who renders the productive capacity more efficient by rendering the producer more intelligent; the lawyer, the jurist, and the statesman who adjudicate conflicting claims and keep men from wasteful disputes. And, finally, there are those whose business it is to amuse and entertain, and who, by relieving the mind of its tension for a while, enable the producer to go back to his work with new energy, new courage, and new hope.

Nor is this merely an academic analysis of society. It is confirmed upon every side by the activities of social life.

Every boy who sets out to secure employment realizes the significance of this process before he has applied at a half-score of places He finds that it is the man who can fit into one or another of these niches that is in demand, and he is in demand because, in one way or another, he adds something to the world's prosperity Incidentally the world repays him in kind

The man who does not "pull his weight," either directly by manipulating an oar, or indirectly by steering the boat, directing the oarsmen to concerted effort, quelling the strife that interferes with effort, caring for them when they break down, keeping their minds in a healthy condition, inventing devices for making their work more efficient and less wasteful, showing them how to apply the experiences of their predecessors to the end of better service, amusing, encouraging, comforting, inspiring them to greater effort — such a man steals his ride, and it is such a man that we term socially inefficient Sometimes he is thrown overboard, but the world has gradually grown away from this remedy because it has discovered that the process really does more harm than good, tending in the long run so to brutalize the workers as to interfere materially with their highest efficiency

(2) That man only is socially efficient who, in addition to "pulling his own weight," interferes as little as possible with the efforts of others.

This requires of a socially efficient individual that he be moral in at least a negative fashion, that he respect the rights of others, sacrificing his own pleasure when this interferes with the productive efforts of his fellows.

(3) That man is socially most efficient who not only fulfills these two requirements, but also lends his energy

consciously and persistently to that further differentiation and integration of social forces which is everywhere synonymous with progress.

This demands of a socially efficient individual that he be positively moral, that he not only refrain from injuring his fellow-workers, but that he contribute something to their further advancement, that he repay to the world not only the cost of his existence, but as much more as his strength and his life span will permit, that he sacrifice his own pleasure, not only when its gratification interferes with the rights of others, but also when its gratification will not directly or indirectly lead to social advancement.

12. "True education, always personal, will develop the social consciousness and promote genuine social culture."[1] This is the standard by which it must select the experiences that are to modify future adjustment. It is obvious that this aim includes the "bread-and-butter" aim, without at the same time involving its pernicious subjective tendencies. No man would be socially efficient who was unable to earn a livelihood. In general, the better the "living" that he procures, the higher the degree of his efficiency. This aim also includes the "knowledge" aim. It recognizes the possible value of every item of knowledge to social welfare; but it does not abstract knowledge from the rest of life or maintain that it is or ever can be a sufficient end in itself. It includes the "harmonious development" aim, for it

[1] J. H. W. Stuckenberg: *Sociology*, New York, 1903, vol. ii, p. 272.

sets up a criterion with which development shall harmonize: those capacities of the individual are to be developed that will best subserve his social needs. And finally it includes the "moral" aim, because, generally speaking, the moral standard is the social standard. It includes the "culture" aim only in so far as conventional requirements are positive factors in social progress.

The standard of social efficiency must be rigorously applied to the products of the school. The school must fit the individual, not for the life of the past, nor for a remote Utopian future, but for the immediate future, the requirements of which can be predicted with reasonable certainty. If it fails to do this, the school cannot justify its existence.[1]

[1] The aim of social efficiency is implicit in all recent educational writings. Cf. O'Shea, *op. cit.*, p. 95, "Education, then, . . . must seek to develop *social action*, it can take no account of possible thought or feeling which exercises no influence upon one's behavior toward his associates in the business of life." See also J. Dewey: *The School and Society*, Chicago, 1899; S. T. Dutton: *Social Phases of Education*, N.Y., 1899.

PART II. THE ACQUISITION OF EXPERIENCE

CHAPTER IV

The Reading of Meaning into Sense Impressions. Apperception

1. Mind is informed of the condition of the various parts of the body and of the happenings in the external world by means of sensations. Each of the sense organs is a nerve structure especially adapted to pick up a certain type of information. The eye responds to light impressions, the ear to sound impressions, the temperature spots to impressions of warmth or cold, the nerve endings in the tendons to variations in strain, and so on. It is necessary that the movements and life of an organism should be governed in accordance with bodily needs and with the condition of the external world, and sensation is the channel through which are reported the changes and happenings upon which adjustment must depend. Adjustment, therefore, is the end toward which sensation is the means. If the body could not be adjusted in accordance with the reports furnished by the sense organs, mind or consciousness would be of no value to the organism; it would be "a luxury without a purpose."

2. But this does not mean that the purposeful character of sensation is obvious from the outset. When the infant first begins to receive impressions from the outer world, these impressions are quite devoid of the significance that an adult would attach to them. The various sensations which the adult would combine and interpret as "nurse" or "mother" are, at first, entirely without meaning to the infant. Indeed, it is probable that they are not joined together in a unitary impression, remaining simply a continuous complex of conscious changes which constitute, in Professor James's happy phrase, "a big, blooming, buzzing Confusion." Gradually, however, these chaotic impressions come to be associated with the feeding process, with the satisfaction of hunger; and slowly — very slowly — the vague, undifferentiated mass of sensation and feeling is resolved into a number of meaningful units — into objects and processes that have a definite reference to the pleasure or pain of the infant's existence. This process of unifying and making "meaningful" the data furnished by sensation is known as ***apperception.***

3. The fundamental law of apperception is this: *the unifying of sensations into concrete experiences is accomplished through the adjustments to which the sensations themselves give rise.* This statement appears to be paradoxical. One might, indeed, infer at first sight that the cart has been placed before the horse; and so in truth the cart is placed before the horse in

the development of experience. The use to which sensations are put determines their significance to the organism — determines, in other words, their meaning. A stimulus is presented to an infant and reaction follows. The stimulus becomes a sensation; that is, the infant is "conscious" of it in a vague, incoherent fashion. A reaction follows upon the stimulus, *but the initiation of the reaction is unconscious;* that is, it follows instinctively or reflexly upon the stimulus and would have taken place even though the stimulus had not entered consciousness as sensation. But this instinctive reaction is also reported to consciousness through the agency of the strain sensations arising in the tendons; the muscular adjustments to which the stimulus gave rise are made data of the child's consciousness and become fused with the original sensations which the stimulus aroused. Repetitions follow, and this association between the sensation occasioned by the stimulus and the sensations occasioned by the instinctive adjustment to the stimulus becomes firmly fixed. Gradually the stimulus loses its vague and incoherent character. It comes to "mean" a definite sort of response, the satisfaction of a definite need.

This may be stated more concretely. Consider, for example, the sucking reflex caused by the stimulus of the nipple upon the child's lips. This reflex may be initiated and probably is initiated in the first days of the infant's life without an accompanying sensation;

in other words, the entire process is just as mechanical as the adjustment that carries the moth to the flame. But there comes a time when the stimulus of the nipple on the lips reaches the conscious threshold. A fraction of a second later the sensation thus aroused is fused with the strain sensations coming from the adjustments of sucking. The two together form a unitary impression closely correlated with the satisfaction of hunger.

The sucking reflex is purposive in its character, but the infant makes a great many movements which are not purposive but rather spontaneous and random, and which are caused by an overflow of energy, as it were, from the motor centers.[1] Suppose that a series of these random movements is going on and at the same time some object stimulates the sense organs of sight, giving the infant a complex of visual sensations. In one of the random movements he may grasp the object that caused the sensations. Immediately his knowledge of the object is amplified. His visual sensations are supplemented by a large number of pressure and strain sensations incident to the movement and the grasping. His perception, which before was vague and meaningless, becomes more sharply defined, more accurate, more adequate.

But this does not tell the whole story. If conscious-

[1] Cf. Baldwin's theory of "excess discharge," *Mental Development: Methods and Processes*, New York, 1895, pp. 179 ff.; also *Development and Evolution*, pp. 108 ff.

ness merely took cognizance of stimuli and of the reactions that heredity has provided for such stimuli, it would fail to serve a useful purpose. Consciousness, however, has a vital function. In the instance of the sucking reflex mentioned above, it is apparent that the entire process represented by the stimulus on the one hand and the reaction on the other would be colored by a pleasant affection. This pleasant coloring would reenforce or confirm the inherited adjustment. But the grasping of the object in the second instance may, on the contrary, have resulted unpleasantly. In this case, the next time that it presented itself, the tendency would be to withdraw from it rather than to grasp it. Thus the first effect of experience upon adjustment is, as Mr. Hobhouse[1] points out, either to *confirm* or *inhibit* an inherited reaction.

So much for the very earliest form of interpreting the data of sensation. If this account be correct, it would seem that the most primitive of mental functions has its basis in the inherited structure of the nervous system — in the inherited tendencies to reaction that operate in the beginning entirely apart from conscious control. The threads that are necessary to combine the data of sensation into meaningful units — into unified perceptions — are furnished by the sensations of strain arising from this reaction. Thus the cart is placed before the horse because nature has provided instinctive adjust-

[1] L. T. Hobhouse. *Mind in Evolution*, London, 1901, pp. 85 ff.

ments that shall serve the purposes of the organism until consciousness is ready to take the reins of conduct into its own hands; and, to continue the figure, instinct must needs give the budding mind a few lessons in the control of adjustment before it relinquishes its authority and becomes the servant instead of the master.

4. The sensations of strain continue throughout life to play the rôle of centralizing or unifying agencies. It is they that weave the thread of continuity through the disparate elements of our experience and resolve the numberless data with which the senses furnish us into definite, coherent, and meaningful unities. To consider a concrete case: Analysis of my present consciousness reveals a complex of visual sensations — light and shade and color — which unite to give me the perception of a certain form. I can also find in my present consciousness a sensation of warmth, the sound of a slight buzzing, a vague, reproduced idea of touching a hard, smooth substance, a revived idea of weight. These are the elementary processes that are just now informing me of an object in my environment. But I have to analyze my consciousness carefully to get these elements out of it, so thoroughly are they woven together in the total perception of the object itself. If I were not trying to "psychologize," I should find no difficulty and little interest in the object before me. I should know it as a *lamp*. That is, I should know it, not as a complex of sensations, some visual, some thermal, some cutane-

ous, some kinæsthetic; but I should know it as an object that furnishes me with light. I should "apperceive" it with reference to the use to which I put it — with reference to its relation to my life.

It might be urged, however, that this attempt to analyze my consciousness of the lamp really does violence to the facts in the case. It is true that I am conscious of the lamp as a unified object and that I am not conscious of the component sensations as such. But what would be the condition of affairs with the infant who sees a lamp for the first time? Would the sensations that the object arouses in him have any reference to his life? What reason would he have for separating it from the rest of the environment — from the table, the books, the papers, and other objects into which we, as adults, read significance and meaning and unity? Or consider the case of the savage who knows nothing of lamps. Would not the bare sensations to which the object gives rise be meaningless to him? — not, perhaps, in the degree in which they are meaningless to the child, for he would try to make something significant out of them, but meaningless when compared with our own interpretation of them?

It seems clear, then, that the analysis given above, while it does violence to the adult conception of things, really lays bare the elements that would be operative in the mind of the infant or the savage. That is, it discloses the original meaningless "stuff" out of which

experience gradually elaborates a meaningful world. The synthesis of chaotic elements into meaningful units is made possible by the fact that certain of these elements stand in a definite relation to some *need* of the organism. This need is represented by a pleasant or unpleasant affective coloring, and the relation of sense impressions to this need is made manifest to mind by the data of bodily adjustment reported through the agency of strain sensations. In adult life, as in the first mental functionings of infancy, the strain sensations form the threads that weave together the otherwise disconnected strands of consciousness. The factor of *use* is the constant factor in all our experiences with objects and processes of the outer world. Chairs, for example, may differ in every imaginable quality, — in shape, in size, in color, in material. But there is one thing that is constant in our experiences with the objects to which we give the name "chair," and that is use or function. While qualitative differences are represented in mind by the sensations of sight, hearing, pressure, taste, smell, etc., use or function is represented by the sensations of strain that originate in bodily adjustment.

The importance of the sensations of strain in reading unity and meaning into sense impressions has only recently been recognized. That they play a prominent rôle in the process of attention (essentially a unifying or centralizing process) was clearly shown by Ribot[1] some years ago, but this represents

[1] Th. Ribot: *Psychology of Attention*, English trans., Chicago, 1889.

only one phase of their manifold duties. Baldwin[1] points out that the motor processes are extremely important in recognition and assimilation: "The sense of assimilation in each successive appearance of the same objective content varies with the different motor shades of attention, just as it also varies for the different sense qualities by reason of the different motor associations, strains, etc., involved in accommodating to the different sense qualities." And again, "Every two elements whatever, connected together in consciousness, are so only *because they have motor effects in common.*" Stout[2] also calls attention in no uncertain terms to the fundamental significance of the kinæsthetic elements: "Perceptual process is penetrated through and through by experiences of movement. Passive sensations only serve to guide and define motor activities."

Still more definite and tangible is the position recently taken by Professor King:[3] "*The differentiation of the special forms of sense experience* from the primary general consciousness takes place as a function of the child's increasing demands for fuller activity. The connections are made possible on the sensory side because they have first occurred, or been made necessary, on the active side. The infant repeatedly finds the same complexes of sensations connected with a certain set of activities. *The activity is a unit,* and the group of eye, ear, and tactual sensations become inextricably bound up with the act, and perhaps come to be symbolic of it; the reinstatement of one of the sensations serving to call up the images of the others as it sets up the activity for which it stands. The unity in the reference of the sensations comes in on the side of the act. Later, when the object is known as an object, the sensations are easily transferred to it, or, rather, the object seen is recognized as the one

[1] J. M. Baldwin: *Mental Development,* New York, 1895, pp. 310 ff.

[2] G. T. Stout: *Analytic Psychology,* London, 1896, vol. i, pp. 212–223; *Manual of Psychology,* New York, 1899, pp. 64, 464–467.

[3] Irving King: *Psychology of Child Development,* Chicago, 1903, pp. 36–37.

touched or seen, because it has been the basis of a previous single activity." And again (p. 37) "If it were not for the connecting activity, there would be absolutely no ground on which the senses could be brought together in their reference and thus become more than mere undefined modifications of the general tonus of consciousness. . . . It is only as something is done with the object, and the various senses coöperate in the doing, that their unity of reference appears . . . The child's first objects are really certain possible activities that are symbolized by certain sensations involved in performing the acts."

5. That the strain sensations really fulfill the important function of weaving together the conscious elements is thus seen to be supported by the testimony of contemporary investigators. It may not be amiss, however, to detail some of the direct evidence that lends support to this contention. This evidence may be classified under three heads: (*a*) pathological, (*b*) anatomical, and (*c*) genetic.[1]

(*a*) *Pathological.* Baldwin[2] has called attention to the mental disturbance known as *apraxia* as throwing light upon this problem. Patients who are afflicted with this disease fail to read meaning or significance into certain of the sensations that come to them from the outer world. They lack the capacity to grasp the significance which the normal mind attaches to objects of common use. This does not imply that there is a disturbance in the functioning of the sense organs, or

[1] It would take us too far afield to note the long series of investigations through which the strain sensations came to be recognized as integral (and integrating) elements of consciousness For this historical data the reader is referred to W. A. Lay: *Experimentelle Didaktik,* Wiesbaden, 1903, pp. 10 ff

[2] J. M. Baldwin: *Mental Development,* p. 311.

of the nerves that carry the impressions to the cortex, or of the nerves that innervate the muscles. The trouble is "central"; it lies in the cortex itself. Nor is it in the centers that receive the impressions, nor yet in the centers that send the impressions outward. It is rather in the centers in which the incoming impressions are associated with other impressions and with the residua that past experiences have left in the form of modifications of nerve structure.

As far as his *use* of the object is concerned, the patient afflicted with this disease approximates the condition of the infant. He sees the object or touches it, just as the infant may, but the past experiences that should enable him to read into it its normal meaning have in some way become dissociated from the impressions of sight and touch. Such a patient may use chairs or books for firewood, confuse the use of such articles as washbowls and drinking cups (drinking out of the one and attempting to wash in the other), and in similar ways show that he has no appreciation of the use to which different objects are normally put.[1]

From a study of apraxia it seems clear that meaning and use are intimately connected with one another, and that loss of meaning carries with it loss of use and *vice versa.* Use, however, must be represented in consciousness by some form of sensation, and the kinæsthetic or motor elements involved in sensations of strain seem to be the natural agencies for fulfilling this function.

(*b*) *Anatomical.* (1) The ground plan of the nervous system — the arrangement of sensory systems, association systems, and motor systems[2] — may be looked upon as substantial evidence that mind exists for the purpose of adjusting the organism to its environment consistently with reports informing of this environment. In harmony with this general arrangement, we

[1] Cf. J. Collins: *The Faculty of Speech: A Study of Aphasia,* New York, 1898, pp. 293 f.

[2] L. F. Barker: *The Nervous System,* New York, 1899, ch. xxvi.

must conclude that the ultimate standard or test of all nervous action is adjustment. It must be in terms of adjusted response that the intermediate sensory and intellectual processes acquire meaning and significance.

(2) Increase in intelligence in the animal series is correlated with increase in delicacy and nicety of motor coordination. On the anatomical side, this delicacy of coordination is represented by an increase in the diameter of the pyramidal tracts — large bundles of fibers that carry the motor impulses from the cerebral cortex to centers in the ventral and lateral portions of the spinal cord, whence their impressions are distributed along the motor nerves to the muscles. The greater the number of fibers, the more complete is the control that the higher centers exercise over the bodily movements, and the more accurate are the coordinations and adjustments with which the organism can meet definite situations of the environment. As one would naturally expect, the diameter of the pyramidal tracts is found to be relatively much greater in man than in the lower animals.

(3) There are recognized in the cerebral cortex several distinct areas that are concerned with the registry of different sensations. Pressure, temperature, organic, and kinæsthetic (motor) sensations are located in the great central region, formerly called the "motor" zone, but now generally recognized as containing sensory as well as motor centers, and known as the "somæsthetic" area. The visual sensations are registered in the occipital lobes, the auditory sensations in the temporal lobes, the smell sensations in the region of the hippocampal gyre, etc. All together, however, these various sense areas occupy only about one third of the surface of the cerebral hemispheres. For many years, physiologists were puzzled as to what function they should ascribe to the remaining areas of the cortex. The great region of the frontal lobes, the area between the parietal and occipital lobes, the ventral portions of the temporal lobes, and the Island of Reil, which together occupy two thirds of the cortical surface, must have some function. So uncer-

tain were the data concerning these regions, that they came to be known as the "silent areas" of the cortex.

To Professor Paul Flechsig of Leipzig must be given the credit for clearing up the mystery of these silent areas[1] After years of study and investigation, he finally discovered a very significant fact, namely, that cells in the silent areas are peculiar in that they have no *direct* connection with the lower centers of the midbrain and the cord, that is, they neither receive impressions from the outer world nor send "orders" directly to the muscles. They are, however, connected by fibers with the sense areas For example, the cells in the extensive region lying between the occipital, parietal, and temporal lobes receive fibers from the cells of the visual, auditory, and somæsthetic areas The inference almost forces itself upon one that these intermediate areas function in connecting the different sense areas. In the parieto occipital region, for example, visual, auditory, and somæsthetic impressions may be united to form meaningful complexes — perceptions and ideas — involving all these sense elements.

If this position taken by Flechsig is valid, — and it is supported by a large mass of evidence from other sources, such as pathology and experimental physiology, — the confirmation that it lends to our hypothesis of the fundamental unifying function of the motor or kinæsthetic elements is plainly apparent. The great somæsthetic area in which are registered the sensations of movement is situated centrally as regards the remaining sense areas It is *directly contiguous* to all the great "association centers" of Flechsig, and it doubtless sends association fibers into all these areas and functions thoroughly as a centralizing and unifying agency.[2]

[1] Wundt's earlier hypothesis, that the frontal lobes are concerned with apperception rather than sensation, was an important suggestion.

[2] P. Flechsig *Ueber die Localisation der geistigen Vorgange*, Leipzig, 1896, *Gehirn und Seele*, Leipzig, 1896.

(*c*) *Genetic.* Interesting testimony in support of our hypothesis is furnished by studies of children's vocabularies and dictionaries. In a "Boy's Dictionary" of two hundred and fifteen words, published by Miss Fannie E. Wolff, and reported by Chamberlain,[1] the following definitions appear: —

> Kiss is if you hug and kiss somebody.
> Mast is what holds the sail up top of a ship.
> Milk is something like cream
> Nail is something to put things together.
> Nut is something with a shell good to eat.
> Open is if the door is not closed.
> Opera is a house where you see men and ladies act.
> Pickle is something green to eat.
> Quarrel is if you begin a little fight.
> Ring is what you wear on your finger.
> Saw is if you see something, after you see it you saw it.
> Tall is if a tree is very big.
> Ugly is if a thing is not nice at all.
> Vain is if you always look in the glass.

Chamberlain also cites the following definitions given by a little girl six years old: —

> Brain What you think with in your head, and the more you think the more crinkles there are.
>
> Death When you have left off breathing and the heart stops also.

Binet[2] quotes the following as characteristic definitions given by his daughters two and one half and four and one half years old: —

> A knife is to cut meat.
> A clock is to see the time.
> A dog is to have by one.

[1] A. F. Chamberlain: *The Child*, pp. 146 ff.

[2] A. Binet. in *Revue Philosophique*, vol xxx, pp. 582–611, cited by Chamberlain, p. 147.

An armchair is to sit in.
A garden is to walk in.
A potato is to eat with meat.
A bird means swallows.
Village means one sees everybody pass.

From these definitions it would appear that the factor of use or function is the predominant factor in the child's conception of an object. It is the one constant factor amidst a diversity of qualities. Professor Earl Barnes[1] gives some statistical results that serve to generalize this conclusion with regard to children: —

"The results, based on fifty examination papers from boys and fifty from girls of each age between six and fifteen years (in all two thousand children sent in returns) contained, as collated, 37,136 statements about the thirty-eight nouns, definitions of which had been requested. Here, again, it seems, the uses and activities of objects appeal to children before structure, form, color, etc. Of the definitions directly reporting use, the proportion for each of the years is as follows: 79.49 %, 62.95 %, 63.83 %, 57.07 %, 43.81 %, 43.69 %, 33.74 %, 37.75 %, 30.62 %, — or, for all ages, 45.58 %."

6. A clear conception of the fundamental rôle that the kinæsthetic elements play in the basal process of education — the acquisition of experience — is essential to an adequate construction of educational principles. As Lay[2] truthfully says, "Pedagogy and didactics have hitherto neglected the kinæsthetic sensations." In a later section it will be shown that primary education has recently come through a process of selection and rejection to hit upon the factor of use or function

[1] Quoted by Chamberlain, p. 148.
[2] W. A. Lay: *Experimentelle Didaktik*, p. 10.

as the corner stone of its philosophy. The emphasis of the industrial feature in the constructive work of the lower grades, the manual training and domestic science of the upper grades, and the agricultural instruction in the rural schools are evidence that the importance of the kinæsthetic element is implicitly recognized by contemporary pedagogy. One of the objects of the present discussion is to make this recognition explicit.

7. *To summarize:* The term "experience" implies that certain mental processes acquire significance to the life of the organism. The "raw materials" of experience are the elementary processes of consciousness — sensation and affection. The making of these processes in their combinations significant — the reading of "meaning" into them — is technically termed "apperception."[1] Sensations that inform of the envi-

[1] It is unfortunate that one must use a term that has fallen into something so akin to disrepute as has the term "apperception." A few years ago Professor James severely criticised certain educational writers and publishers for attempting to foist upon the rank and file of teachers a number of so-called works upon educational psychology, purporting to explain the hidden meaning of obscure technical terms. An understanding of these terms, it was intimated, would furnish an *open sesame* to successful teaching, and among them apperception was easily the most mysterious and bewildering. While Professor James was justified in exposing the shallowness of these works, one must certainly admit that he went rather farther than the facts seemed to warrant. That writers of indifferent psychological training should have placed the term "apperception" under a temporary shadow of distrust is assuredly not a sufficient ground for dismissing the concept as merely a "convenient name for a process to which every teacher must frequently refer," but which "psychology itself can easily dispense with." True, as James says, "it verily means nothing more than the act of taking a thing into the mind." And true it is that digestion means

ronment are interpreted, not according to their intrinsic nature, but according to their reference to the *needs* of the organism. This last statement involves some important pedagogical corollaries which will be discussed in the following chapter.

nothing more than taking food material into the body. But just as no physiologist would think of dismissing digestion with so superficial a definition, so a psychologist should not try to conceal the fact that the process which this name covers, and which is so easily described as to its general function, is one that is most complex and baffling when an attempt is made to analyze it (Cf W James *Talks to Teachers on Psychology*, etc., New York, 1899, pp. 155–168.)

CHAPTER V

The Needs of the Organism as determining Apperception: Degrees of Apperception and Apperceptive Systems

1. Mind interprets impressions from the outer world, not according to their intrinsic nature, but according to their relation to the needs of the organism. These needs may be roughly grouped into two great classes: (*a*) *primitive* needs, correlated with the fundamental instincts or tendencies that man has inherited from his brute and savage ancestry; and (*b*) *acquired* needs, correlated with those readjustments and modifications of primitive tendencies that have been made necessary by the changed conditions of human life, and particularly by the growth of social forces as opposed to individual forces.

The primitive needs can be reduced to one or the other of two fundamental types of instinct: (*a*) self-preservation, and (*b*) race perpetuation; or, more briefly, the food instinct and the sex instinct. When the former is predominant, sensations that inform of the environment are interpreted — apperceived — with reference to self-preservation; objects of the external world appeal

to one, as food, shelter, weapons, etc. When the latter instinct is predominant, one interprets objects of the outer world with reference to the sex impulse — as decoration, means of attraction, etc.

With the advance of social organization, however, these primitive needs, represented ultimately by one or the other of these two fundamental instincts, become more and more remote, more and more overlaid by intermediate processes. One no longer apperceives objects with reference to their direct bearing upon self-preservation or race perpetuation. One no longer works for the *immediate* gratification of desire or appetite. These may be the ultimate driving forces, but they are frequently lost to view in the complication of the processes that intervene.

2. *Degrees of Apperception.* Apperceptive functions may, therefore, be classed into (1) those of low degree, and (2) those of high degree, according as one reads a primitive or complex meaning into sense impressions. For example: the apperception of a teacup as a missile to be hurled at a supposed enemy is an apperception of low degree; the apperception of the same group of impressions (through which we "know" the teacup) as an object to drink from is an apperception of a higher degree; while the apperception of a teacup as an object of beauty — a delicate piece of bric-a-brac — is an apperception of a still higher degree. In every case the externally aroused sensations that inform us of the

teacup are the same; but in every case we read a different meaning into these sensations.

The patient afflicted with apraxia may use a chair as a club or as firewood. This means that his higher apperceptive functions have been cut away. He has been reduced to the plane of primitive needs. The normal individual uses a chair to sit in; he apperceives it with reference to this need, which is obviously of a later growth than the use of an object as a club or weapon. But the antiquarian may see the same chair entirely apart from its conventional use; he may apperceive it as a representative of some forgotten craftsmanship — some "lost art" of wood carving, perhaps.

These examples may serve to clear up the significance of the terms "primitive" and "acquired." The use of objects as utensils or as articles of furniture is not instinctive; it must be "learned." And it goes without saying that the apperception of an object entirely apart from its "utility" is a product not of heredity but of acquisition.

3. The reactions that form the important features in apperceptions of low degree involve the larger movements of the body. Hurling and striking are crude movements: the muscles that are brought into play are the more fundamental, the more deeply seated; the coördinations are few and comparatively coarse. Drinking from a cup, however, involves movements slightly more delicate: it brings into play smaller and less fun-

damental muscles; the adjustments are more complex and require a greater nicety of coördination. Finally, when, for example, one admires a delicate, fragile piece of bric-a-brac, — a masterpiece of ceramic art, — the motor adjustments and coördinations are of the most refined character. To one whose smaller muscles have had no training, this appreciation is impossible. The keen delight of the enthusiast is conditioned by a highly organized nervous system. To the child, to the savage, to the boor, these refinements of art are meaningless. He cannot apperceive because the complex and highly organized system of associations and reactions that means apperception is lacking.

Degrees of apperception do not seem to have been recognized by the Herbartian writers, who have made the most exhaustive analyses of the general process. Herbart[1] himself ascribes the difference between the apperception of the child and that of the adult to a lack of experience upon the part of the former. He states the law: "Apperception is the less probable the more meager the experience of the individual. Children and uncultured men apperceive but little, because there is lacking in them a mass of apperceiving ideas."

It is, however, a mistake to assume that children and uncultured men apperceive *little*. They may apperceive as much as the cultured adult, but they apperceive in a different way — on a lower level. They "see things" in the light of their own simple, primitive needs, not in the light of the acquired and highly complex needs of the adult. They read into sense impressions a primitive, uncultured meaning.

[1] J. F. Herbart: *Psychologie als Wissenschaft*, pt. ii, p. 197, in Hartenstein's edition, *Sämmtliche Werke*, Leipzig, 1850, Bd. v.

4. *Apperceptive Systems.* The mental disturbance known as apraxia has been cited to illustrate degrees of apperception. Another characteristic of the apperceptive process is revealed in a related mental disturbance, sensory aphasia. This disease is similar to apraxia, except that the loss of meaning affects words rather than objects. When one loses the capacity to interpret spoken words, the affliction is termed "auditory aphasia"; when the capacity to interpret written or printed words is disturbed, the affliction is known as "visual aphasia." The two forms together constitute sensory aphasia — a genus, as it were, of which the others are species. In either auditory or visual aphasia there need be no disturbance of hearing or vision as such. The patient hears the word, but it is simply a complex of meaningless sounds; he sees the word, but it is merely a jumble of marks upon a white page. The significance that years of experience have put into these sensations has been cut away. But, at the same time, the meaning of auditory and visual impressions not connected with language is not necessarily lost. The patient may recognize objects of everyday use in a normal fashion; he may recognize sounds other than those connected with speech, and react appropriately to them.

That sensory aphasia is really a disturbance of apperception is clearly brought out by a case of the visual variety described by Dèjerine.[1] A merchant lost the

[1] Cited by J. Collins: *The Faculty of Speech*, pp. 262 f.

ability to put meaning into printed or written words and sentences — the ability to read. At the same time, however, he found no difficulty in recognizing letters that he used arbitrarily as price marks on his goods. That is, the very same sense contents — letters — were full of meaning to him in one phase of his life (selling goods), but utterly devoid of meaning in another phase (reading). Put in a more general way, this means that *the same complex of sensations means different things to the same individual at different times.*

To-day I meet my students in their classes, to-night I meet the same students at a social gathering. They are the same individuals, but my attitude toward them has changed I quiz them in their classes in a manner that would stamp me as a bore if I did it at a social gathering. This morning I dissect calves' brains at the laboratory, at noon I have calves' brains served up for lunch. The brains are similar, but my attitude toward them has changed. The physician meets a patient in his office. As a physician, he looks upon the patient in a professional light. He inquires into the workings of his heart, his lungs, his digestive tract. The patient is to him a bundle of tissues, and it is the physician's business to see that these tissues work together harmoniously. Two hours later the same physician meets the same patient socially. The professional attitude is no longer prominent. The patient is a friend to be amused with an anecdote, or he is a rival at billiards, or he is, perhaps, a competitor for feminine preference. And yet, intrinsically speaking, the patient is no less a bundle of tissues than he was earlier in the day. He is the same patient, and the physician knows him through the same sense complexes, but the "meaning" that the patient has for the physician is quite different.

The tendencies to reaction, therefore, — whether inherited or acquired, — come to be systematized, grouped together, with reference to large functions of life.[1] One has different attitudes toward things, — a professional attitude, a social attitude, a work attitude, a play attitude, etc. According as one has one or another of these attitudes, one interprets sensations in this way or that. A group of systematized tendencies to reaction is termed an "apperceptive system." Each system represents an *adjustment to a phase of the environment, which adjustment is constant with us while we are in a certain mood.* A system may therefore be of high or low degree, according as it refers to a primitive or a highly developed need of the individual. The apperceptive system that is operative when the physician sees in his patient only a bundle of tissues and that which is operative when he sees in the same patient a social equal are both systems of relatively high degree; but the system that operates when I look upon a calf's brain as an intricately complicated organ for controlling action is higher than that by which I apperceive a similar brain as an article of food.

The tendency, of course, is for one to get into a "rut" with advancing years. This means that a single large apperceptive system comes to function practically to the exclusion of all others. I should indeed be fortunate if I could lose entirely my attitude as teacher when I meet my students socially. The physician would be equally

[1] Cf. G. F. Stout: *Groundwork of Psychology*, New York, 1903, pp. 7–9.

fortunate if he could drop entirely his professional attitude when he meets his patients socially. The ability thus to change one's larger apperceptive systems as one changes one's coat varies with different individuals and at different ages. The child in his play adjustments represents, perhaps, the maximal plasticity of apperceptive systems. "Let's play house. Let's pretend that this stone is a table!" Straightway the stone becomes a table, only to be changed a half hour later into a stove, a store, a steamboat, or a wagon.[1] To the adult the stone is now perhaps a representative of some geological stratum; again, it may be material for a good horse block; again, a sample of excellent building material. But the chances are that, according as the adult is a geologist, a horseman, or an architect, one or another of these apperceptive systems will overshadow all the others. The merchant cited by Dèjerine was undoubtedly more a merchant than a man of letters. The apperceptive system that represented his commercial activities was, comparatively speaking, fundamental in his life. Consequently, when disintegration set in, it failed to affect that part of his experience.

5. Both heredity and experience have a share in determining the structure of the larger apperceptive systems.

[1] The larger systems of apperception are well illustrated by the different attitudes of children, which in turn are manifested by entirely distinct vocabularies. The boy has one set of words and constructions which he uses with his playmates and another set for the schoolroom. He never confuses the two.

Every individual inherits certain peculiarities of nervous structure that manifest themselves in certain tendencies to reaction. One person is slow and deliberate, another quick and impetuous, another morose and brooding, another gay and cheerful. These "predispositions" to reaction obviously have an important influence upon the way in which one "looks at things." It is common to speak of the dyspeptic as viewing the world through blue spectacles. His dyspepsia may be due to inherited tendencies, but it may, just as certainly, be due to environmental forces. And so it is with all cases of temperament or mood. One cannot draw a line accurately between the influences of heredity and the influences of experience. But here, as elsewhere, it is safe to say that the latter is by far the more important factor. In either case some force has been at work to give the nervous structure a peculiar bent.

This is what Professor Titchener[1] refers to when he defines apperception as a "perception whose character is determined wholly or chiefly by the peculiar tendencies of a nervous system rather than by the nature of the thing perceived." Needless to say, the great bulk of one's perceptions are determined in this way. This fact is impressed more forcibly when one remembers that the peculiar tendencies provided for by heredity are, during the process of growth, supplemented in far greater number by the peculiar tendencies due to modifica-

[1] E. B. Titchener: *A Primer of Psychology*, New York, 1899, p. 88.

tions of nerve structure through experience with the environment.

It is this condition that renders it so difficult to eliminate the "personal equation" from scientific observation. So completely are our perceptions colored by the hues and tints of our peculiar apperceptive systems, that only by the most strenuous effort are we enabled to separate in any act of observation what we really see from what we "think" we see.

6. Apperceptive systems of low degree are most profoundly influenced by inherited tendencies. Self-preservation is the first law of nature. Race perpetuation might analogously be called the second law of nature. These fundamental instincts lie at the basis of primitive apperceptions; but these primitive systems come, in course of time, to be overlaid with, and modified by, others of higher degree. Experience is elaborated by the exigencies of a complex social environment. The relation of our surroundings to our individual existence is determined by social forms and usages that all but rob life of its primitive significance. Yet the "all but rob" is a saving clause. Directly *or remotely*, the manner in which mind interprets or apperceives new impressions is determined by the relation that these impressions bear to the existence and survival of the organism. It is a maxim of pedagogy that apperception functions most readily along the lines of interest. Interest attaches most strongly to that which has a vital relation to one's well-being. But in a social environment, one's well-

being is determined by factors far different from those that operate in a purely "natural" environment.

Civilization means an overlaying of selfish impulses with impulses of a social nature;[1] in such a way, however, that the former are not entirely eradicated, but rather chastened and subdued in the light of reason. And so the business of the school is to overlay the lower apperceptive systems with those of higher degree; but the school must never lose sight of the fact that the well-being of the individual always lies, directly or remotely, at the basis of dominant motives. The well-being of the individual finds its subjective counterpart in pleasure. But there are pleasures of a high order and of a low order. The essence of civilization is that *remote* and not immediate pleasures govern conduct; *remote* and not immediate ends determine action. And the capacity of man to govern his conduct by remote ends *depends entirely upon a process of education.* This proposition will be the thesis of the next chapter.

[1] Mr. Hobhouse takes a different view of this matter. "The conception of a primitive egoism on which sociability is somehow overlaid is without foundation either in biology or in psychology. . . . For the impulses of sex and provision for the young, if not unselfish, at least do not tend to self-maintenance" (*Mind in Evolution*, London, 1901, pp 339 f.) It is certainly true, as Mr Hobhouse says, that the parental and sexual impulses make for the preservation of the race, but it is none the less true that *subjectively* the working out of these instincts satisfies an *immediate and individual desire* The racial or altruistic implication is, after all, only an implication, as the same writer so clearly points out in a later chapter (ch. xvii), and the task of civilization, as he himself states it, is to make this implied or unconscious altruism explicit or conscious.

7. Thus far the term "apperceptive system" has been used to cover a group of tendencies that determine the meaning or significance that is read into any given complex of sense impressions. The individual's "moods" and "attitudes" constitute "large" apperceptive systems. These may be conditioned either by heredity or by environment, but the latter factor is by far the more important. In general, then, the majority of the apperceptive systems that operate in the normal individual may be looked upon as resultants of a vast number of experiences or, briefly, as *condensed experiences.* The "large" apperceptive systems that have been mentioned constitute only a specific class. Whenever one has a number of experiences that have been condensed and systematized, one has an apperceptive system. It may be large or small, according to the variety and scope of the experiences that it covers, but in either case it fulfills an important function in the economy of mental life, as will be shown in a later section.

CHAPTER VI

Attention, Interest, and Will in the Light of Apperception: the Doctrine of Work

1. The following conclusions result from the development of the last two chapters: (1) In the beginning, experiences are assimilated with reference to the primitive needs of the organism, such needs being represented by the instincts. (2) As development continues, the primitive needs come to be overshadowed by acquired needs; these are represented by outgrowths of instinct due to the modifying operation of experience; thus experiences may be said to grow upon themselves — once grafted upon instincts, they assimilate one another. (3) With continued development, fairly constant systems of experience come to be organized to which new experiences are referred. (4) Assimilation with reference to a primitive instinct is an apperception of low degree; assimilation with reference to an acquired need is an apperception of higher degree — the higher, the more remote is the need from the primitive instinct. (5) The business of education is to replace the lower apperceptive systems with those of higher degree — to develop the higher needs and cater to them. The task of the

present chapter is to show that the higher needs can be developed only through a process of education. To this end it will first be necessary to examine the relations that exist between apperception and attention.

2. Attention is best described as a *state* of consciousness that presents a focus and a margin.[1] One group of ideas or perceptions occupies the focus of consciousness for the time being as the thing "attended to"; the remaining components of consciousness are relatively vague and indistinct ideas or perceptions, grouped about the central or focal idea.[2]

In listening to an orchestral selection, for example, the perceptions of timbre, interval, rhythm, etc., occupy the focus of consciousness. Grouped about this focal complex are various other elements: visual data concerning the players and their instruments; touch and kinæsthetic data concerning the position of the body, pressure of the clothing, and the like; thermal data concerning the temperature of the room; and all these mingled with ideas, the residua of past experiences, reawakened by the music, or by other of these data.

3. There are four important differences between the marginal and focal constituents of consciousness: (*a*) the focal idea or perception is the clearer; (*b*) it is the more enduring; (*c*) it is the more easily revived; and (*d*) it

[1] Cf. O. Külpe: *Outlines of Psychology*, trans. Titchener, London, 1895, pp. 423 ff.

[2] It is generally agreed by psychologists that but one datum of consciousness can occupy the focus of the conscious field at a given instant of time. For the results of a careful analysis of the literature upon this point, see J. P. Hylan, "The Distribution of Attention," in *Psychological Review*, 1903, vol. x, pp. 373-403, 498-534.

is the more associable. It follows from this that a conscious process is valuable to an organism *because of attention to that process;* for the fact that the process attended to is clear, enduring, revivable, and associable means that it will function more readily in later adjustments, and this is the characteristic that gives to consciousness its value in the life process. Therefore an answer to the question, "How does an idea or perception get into the focus of consciousness?" will form a very important part of the answer to the more general question, "How are experiences acquired?" The conditions of focalization are thoroughly discussed by text-books and treatises on psychology and need be only briefly referred to at this point.[1]

4. (*a*) *Passive Attention.* There are certain impressions to which attention is involuntarily or spontaneously directed. One attends "naturally" to intense stimuli of all kinds, — to loud noises, bright lights, sharp pains, etc.; one attends naturally to movement; one attends naturally to contrasts. The tendency to focalize such stimuli is inborn or innate. It is to be classed among the inherited tendencies of the nervous system which were mentioned in a previous chapter. "In the order of

[1] The classification of the forms of attention that follows is based upon that presented by Professor Titchener, in his *Primer of Psychology*, New York, 1899, ch. v. As will be seen in the sequel, it possesses certain advantages over a twofold division. A fourfold division, based upon a similar principle, is presented by Mr. Stout. (*Groundwork of Psychology*, ch. vi.)

nature," says Professor Brooks, "each stimulus is a sign with a significance." In the early history of mind, strong stimuli were danger signals, and the animal's survival was conditioned upon its ability to notice them and react appropriately to them. Hence the forms possessing this capacity were "naturally selected" to survive. To-day this capacity is not significant to survival in so high a degree; yet it still persists, subdued and overlaid in the course of experience by other tendencies, but still cropping out at frequent intervals.

The tendency to follow movement is typical of all forms of passive attention. Whenever a moving object stimulates the periphery of the retina,—that is, when one sees movement out in the margin of the visual field with the "tail of the eye,"—the tendency is always to turn in the direction of the moving object. It is a significant fact that a very slight movement can be perceived with the non-foveal portions of the retina when it cannot be perceived in direct vision—that is, by looking directly, focally, at the moving object.[1] It is easy to see how this capacity came to be selected in the process of evolution. The animal that could perceive its enemies creeping up from the side, while, at the same time, it appeared to be looking "straight ahead," would have an obvious advantage in the struggle for existence. The capacity is, however, practically without significance to-day. The astronomer, it is true, makes use of it in observing the entrance of a star into the field of telescopic vision, because he has found by experience that his observations are more accurate if he uses the outlying portions of the retina rather than the fovea. But with the average man, living under

[1] Cf. some interesting conclusions regarding the functional differences between focal and marginal vision in perception of motion, R. Dodge, in *Psychological Review*, 1904, N. S., vol. xi, pp. 1–14.

the conditions of civilized society, the capacity is merely a "vestigial organ" of the mind, the useless remnant of a once-significant function, — except, perhaps, in the congested districts of the large cities, where pedestrianism is perilous.

5. (*b*) *Active Attention.* But if one had always to follow the strongest external stimulus, — if the strongest stimulus always forced itself into the focus of consciousness, — one would be literally at the mercy of the environment. Sustained effort and all that it implies would be hopelessly out of the question. It is well, then, that in the development of social life, these distracting stimuli have come less and less to mean danger to the organism; hence the importance of attending to them has come gradually to be reduced. At the same time, social development has demanded that the individual govern his action with reference to remote rather than immediate ends. This means that present stimuli must be neglected in order that past experiences may be revived, and the relation between past experience and present or future situations adequately determined.

With the diminution in value of the strong stimuli, therefore, there comes an enhancement in value of ideas and weaker stimuli,[1] due to the exigencies of social life. But the older conditions always operate in greater or less degree. Just as the primitive impulses given through heredity cannot be entirely eliminated; and just as self-

[1] We still follow the strongest stimulus, but not the strongest *external* stimulus. Ideas and weak external stimuli become reenforced from within.

preservation is still the first law of nature, even in the most highly organized societies; so the intense, the moving and the contrasting stimuli from the outer world always *tend* to distract the mind from other processes. This tendency expresses itself in movement which must be inhibited or checked. Thus originates the *effort* that characterizes this later development of attention. It is always a battle as it were against nature — a constant struggle against fundamental forces.

6. (*c*) *Secondary Passive Attention.* But if attention to the important things of social life, and inattention to those danger signals that meant so much to primitive life, always involved a struggle, the chances for advancement would be greatly curtailed. To be maximally efficient, mind must devote all its energy to the task in hand. When part of this energy is used up in resisting distracting stimuli, efficiency must be seriously interfered with. Hence it is fortunate that active attention may work over into the passive form — that ideas and weaker stimuli, at first attended to only through strenuous effort, come to be attended to without appreciable effort. This "secondary passive attention" is identical with the primary passive form as far as its immediate conscious effects are concerned, but it differs from the latter in its genesis. It is not the result of inherited or instinctive tendencies, but is rather to be looked upon as an acquired art, and furthermore as *an art that can be acquired only through a period of active attention or effort.*

7. *Work and Play.* In this distinction between passive, active, and secondary passive attention are revealed the psychological principles that differentiate work from play. Both work and play are forms of activity, but work means activity directed toward a remote end, while in play the activity is an end in itself. The mind is constantly open to distractions — it always tends to follow the lines of least effort. And because it is so difficult to resist distractions, the capacity for work is generally conceded to be the greatest conquest that man has made in his rise from the brute. One of the first signs of a return to ancestral conditions — of a "reversion to type" — is the incapacity for sustained effort — for active attention. This tendency to revert to type is latent in all men. It finds expression in the love for change, the desire — sometimes overwhelming — to do "something else."

There are those who work and work well with a variety of conflicting and intense stimuli pressing in upon them from all sides.[1] But this habituation to distracting influences comes only after a long and tedious process of discipline and training, and it is seriously to be doubted whether the worker ever does his best under such conditions. Normally our minds are so sensitized that one who lives "in the midst of alarms" almost necessarily "burns the candle at both ends."

But apart from those who are adapted to this overplus of distraction, there are others who are veritable slaves of distracting influences. To them quiet and seclusion are irksome and laborious, and the occupations that involve the absence of

[1] A *slight* distraction is probably essential to the best work.

frequent distractions become tedious and unbearable. The love of change which is sporadic and occasional in the average man is normal with them. Such individuals may be capable almost to the point of genius, but the incapacity for sustained effort renders their exceptional gifts almost entirely without value In short, the abnormal liking for change and variety, for "life" and noise, for the excitements of the theater, the race track, and the gaming-table, is unmistakable evidence, either of arrested development, or of decay and degeneration. It is something that grows upon itself, idleness begets idleness. At best the supports that hold the race to the plane of civilization are frail and insecure enough. Release the tension ever so little, and the entire structure topples to the ground. How hard it is to be civilized and how easy it is to be primitive and brutal is only thoroughly appreciated by those who have slipped from the plane of humanity and are painfully struggling to climb back.

It is in times of material prosperity that this danger is most strenuously to be combated, for it is then that the innate desire for distraction most easily finds an outlet The sophistries of ease and comfort then most readily eat their way into the popular mind, catering to the love of change, the appetite for distraction, the enervating influences of dissipation and prodigality. This is, perhaps, why one finds in history that the seeds of national decay have frequently been sown in eras of great prosperity.[1]

8. The capacity for work is the capacity for sustained effort. It means concentration, organization, and per-

[1] It may be urged that civilization owes not a little to the restless spirits of all ages. But the really great names of discovery and exploration and early settlement were borne by men of another type, — men to whom the pleasure and excitement of novel scenes and strange adventures were but incidental to the strenuous accomplishment of a set purpose.

manency of purpose. The intense desire for activity is not in itself sufficient. Children and savages possess this in great abundance. Not activity alone, but sustained and directed activity has been the keynote of human progress. Individually it expresses itself in unremitting effort toward the attainment of a far-off goal. Psychologically it means the subordination of inherited impulses to remote ends. In popular language, it is the expression of "will power" or "self-control." The man with a "strong will" is the man who can subordinate "lower" to "higher" motives; and lower and higher are genetically correlated with the immediate and the remote, with instinct and reason.

"Active attention" and "will" may, therefore, for our purposes, be looked upon as synonymous terms. Volitional effort is a struggle against desire — generally speaking, a struggle against instinct, against an impulse of a lower order. It has, however, a positive significance. The natural tendency may sometimes be to react in the primitive instinctive fashion, and this tendency must frequently be inhibited or controlled; but perhaps it is oftener the case that the desire for *inaction* must be overcome. That is, while the desire to do "something else" is always at least latent, the desire to do nothing at all is perhaps more frequently in evidence. Active attention is no less a battle against "laziness" than against "indolence," and this becomes increasingly true with advancing years. Children are

seldom "lazy," but they are normally and constitutionally "indolent." In other words, they are not inactive, — activity indeed may be called the first law of child nature, — but they are averse to continued effort along a given line; they abhor monotony. The adult, on the other hand, is more frequently "lazy" or desirous of inaction.

An "act of will" is a condition of attention in which the struggle against the lower tendencies or impulses is especially strenuous. In ordinary life, the social or moral (*i.e.* artificial or civilized) conduct becomes ingrained as habit — becomes "second nature." This is what Ribot[1] means when he says that the lower tendencies are always the stronger by "nature," while the higher tendencies are sometimes the stronger by "art." It is only another way of stating the difference, already noted, between primitive and acquired needs, between apperceptive systems of low and high degree. But always the tendency to follow the lines of least effort — either to react in the natural or inherited fashion or to remain inert — is at least latent. When this tendency becomes so strong as to demand a conscious struggle between apperceptive systems, we have the volitional consciousness.

9. From the above analysis, it is apparent that the terms "apperception" and "attention" simply indicate two aspects or phases of one and the same phenomenon.

[1] Th. Ribot: *Diseases of the Will*, Chicago, 1894, p. 50 (English trans.).

Attention is a structural term; it describes a certain state or pattern that consciousness may assume. Apperception is a functional term; it describes what mind does when it is in the attentive state — and what it does is to assimilate experience, to read meaning into sense impressions, to bring perceptions and ideas into relation with the needs of life.

In passive attention, the processes upon which attention is focalized are "apperceived" with reference to primitive needs; passive attention, in other words, means an apperception of low degree. In active attention, there is a struggle to lose sight of the primitive needs and to apperceive with reference to the higher needs; but the primitive needs still solicit attention, hence the effort and struggle that are necessary in order to keep them down. In secondary passive attention, the struggle is no longer present. The primitive need has been conquered and the remote need has taken its place.

10. Systems of apperception are represented structurally by the "marginal" constituents of the attentive state. While he is in the professional attitude, the physician has a certain adjustment toward his patient which is represented by a definite tension of the muscles. This tension, in turn, is reported to consciousness through the sensations of strain. These are fairly constant as far as the professional attitude of the physician is concerned. But because they are constant in innu-

merable cases, they are gradually relegated to the background, to the margin of consciousness. Other marginal features doubtless contribute to this apperceptive system — the suggestive apparatus of the office, the odors of drugs, etc. But the important elements are the muscular and strain sensations.[1]

11. The doctrine of apperception, with its implications concerning attention and will, goes far toward clearing up the problem of interest, recently so vigorously discussed in educational circles.[2] As stated above,

[1] While the intimate connection between apperception and attention has been recognized by several authorities, — among them, Herbart (*Psychologie als Wissenschaft*, pp. 200 ff.), Wundt (*Outlines of Psychology*, tr. Judd, Leipzig, 1902, pp. 227 ff.), and Stout (*Analytic Psychology*, London, 1896, vol. ii, pp. 118 f.), — it remained for Professor James to *point out the significant function of the conscious margin in mental life*. (See his *Principles of Psychology*, New York, 1900, vol. ii, p. 49.) That the marginal elements which, according to James, "carry the meaning," are made up predominantly of strain sensations was first suggested to the author by Professor H. H. Bawden's "Study of Lapses" (*Psychological Review Monograph Supplement*, 1900, vol. iii, no. 14). Very recently Mr. H. R. Marshall has elaborated a theory which identifies the concept of self with the field of inattention, or the margin of the conscious field. He divides the concept of self up into a number of subordinate "egos," and identifies each of these with a certain attitude which, if we understand his position aright, is structurally represented by the marginal elements of consciousness. (See H. R. Marshall: "The Field of Inattention — the Self," in *Journal of Philosophy, Psychology, and Scientific Method*, 1904, vol. i, pp. 393-400.)

[2] Cf., for example, W. James: *Talks to Teachers on Psychology*, New York, 1899, ch. x; M. V. O'Shea: *Education as Adjustment*, New York, 1903, pp. 146 ff.; C. A. McMurry: *Elements of General Method*, New York, 1903, ch. iii; J. Dewey: *Interest in Relation to Will*, etc., second supplement, *Herbart Year Book*, 1895; C. De Garmo: *Interest and Education*, New York, 1903.

it is an educational truism that apperception functions most readily along the lines of interest. This is only another way of saying that one assimilates experiences according to one's needs, for the needs of the individual determine his interests. The two varieties of needs — primitive and acquired — suggest a similar classification of interests into two groups which can be conveniently represented by the same two terms. Primitive interest is the pleasurable affective state that accompanies primary passive attention. Acquired interest is the pleasurable affective state that accompanies secondary passive attention. Active attention — inasmuch as it always means a struggle against desire, against that which would normally be pleasant — is obviously always unpleasant.

So long as the pedagogical doctrine of interest meant the following of the lines of least resistance, its failure as an educational principle was absolutely certain. Always to obey the dictates of interest, in this sense of the term, would mean the instant arrest of all progress. But if the interest means the desire for a satisfaction of acquired needs, the case is somewhat different. The child is no longer at the mercy of the strongest stimulus; sustained attention directed toward a remote end has become possible. But the point never to be forgotten is this: *acquired interests are developed only under the stress of active attention.* Always there must be some inhibition of natural tendencies at the outset. The

passion for change, the insidious and often overwhelming desire "to do something else" must be strenuously repressed.

It is at this point that the function of the teacher is all-important. As far as passive attention is concerned, the child needs no guidance; when he has reached the stage of secondary passive attention, he needs little guidance; but the stage of active attention is the field in which the arts and devices of the teacher find their highest utility. To see to it that the child's development is not arrested on the plane of play is the serious business of education. To determine the point at which the mind must be guided, pulled, or prodded on to a higher plane of functioning is the duty of educational science. But the task of guiding, pulling, or prodding is assigned to the teacher.

It is this task that makes the work of the teacher, especially in the elementary schools, so largely a battle against nature. It could not well be anything else. One may seriously doubt whether there is anything innate in the child that will lead him to the increased effort that this implies. Civilization in the race has cost a struggle which the exigencies of the environment have necessitated. No race with whom the conditions of life were too easy has ever reached the higher planes of development. There is no reason for believing that the civilization of the individual can be accomplished by following the lines of least resistance.

It is clear, then, that what we commonly term "work" is, biologically, the central feature of education. The play of childhood bears all the earmarks of passive attention. Its end is immediate, it follows the strongest stimulus — the lines of least resistance. It is not sus-

tained, creative, or directed toward a remote end. All this must be changed; gradually, it is true, but none the less surely and certainly. The child must be civilized, and, as we have said again and again, the essence of civilization is that remote and not immediate ends govern conduct.

12. But if the doctrine of apperception emphasizes work or effort as the fundamental factor in education, it also indicates in terms equally unmistakable that the task of education may be materially simplified by leading the child as rapidly as possible to acquire the higher needs. Until some need is distinctly present, the assimilation of experience is slow and halting. The individual would learn arithmetic willingly enough when, in adult years, he perceives the value of arithmetic to his survival. But unhappily this would probably be too late to do him much good. At any rate, the task would be infinitely more laborious and the individual's time and energy much more in demand for productive pursuits. One vital necessity of education, therefore, is to develop *in the immature child* needs that will demand the acquisition of experiences *that will be beneficial in mature life.*

Until recently, educators gave little heed to this problem. The child "learned his lessons" under compulsion. His common motive was to avoid pain. This meant the assimilation of experiences with reference to needs of a low order. Not only were the apperceptions of

low degree, but the stage of secondary passive attention was seldom reached. Always there was a tremendous waste of energy in the conflict between the desire to follow the lines of least resistance and the desire to avoid pain.

One of the watchwords of modern civilization is "elimination of waste." Modern education is slowly recognizing that it is economy to develop acquired interests, — that the primitive interests may be replaced with higher needs to the great saving of time and energy. At the same time, it has been recognized that these higher interests must not be so high as to be entirely out of reach of the child. There must be an adjustment, a compromise. Education consequently does not neglect the instincts, the primitive interests. On the contrary, it seizes upon them and turns them to its own ends, seeking slowly to transform them into acquired interests representing ever higher and higher needs. This process may be illustrated by reference to a few of the current practices in elementary education.

(*a*) When the child enters school, he is in the period of play, — the stage of passive attention. His apperceptions are determined by primitive needs. His end is the immediate satisfaction of desire. Sustained attention is as yet an undeveloped capacity. Consequently he has but few acquired needs, and these of a relatively low order.

The first task of the teacher is to search out a dominant instinct. It is now believed that instincts have their periods of rise and dominance and decay just as other vital forces. Not

all instincts are in the ascendant at the same period of time;[1] consequently the teacher must know something of this rhythmic movement. It is probable that the instinct of imitation will offer the most favorable avenue of approach. The child, at about the age of entering school, delights to repeat in his play adjustments various economic processes of the world about him.

The teacher plans a playhouse which the children are to make and furnish for themselves. Here is a remote end that corresponds to an immediate interest. The consummation of this end will occupy perhaps several weeks. *Left to himself, the child would tire of the process within a brief period.* The house would be neglected for "something else" and soon forgotten. But the teacher, while he permits frequent rests and changes, aims to keep the child returning to the task until it is accomplished. Gradually the instinct of imitation is replaced by a higher interest, — the interest of "construction"; primary passive attention has grown into secondary passive attention. And yet, even with an objective process, such as building and furnishing a playhouse, there has been an indispensable link of active attention, a period of effort, of work, — perhaps even, brief though it may be, of drudgery.

(*b*) In the upper grades, the work of instruction in language, and especially in grammar, has always been a tender spot in the curriculum, and very largely because it has been difficult to arouse the acquired interest, to make the subject matter *vital* to the child. Grammar has seemed to have no connection with the pupil's life. Consequently its mastery has been a lifeless, formal process.

The teacher of language to-day attempts first of all to develop the need. Every child must express himself; every

[1] The science of child study is gradually working out this problem by accurate methods. The work of Sully, Kline, Gulick, Croswell, Taylor, Burk, Lindley, Bryan, and others is important in this connection. An excellent summary will be found in I. King: *Psychology of Child Development*, Chicago, 1903, ch. xiii.

child takes a certain delight in expression. He likes nothing better than to talk about the things that interest him, and he likes to inform others about these things. The problem of the teacher of grammar is to show that, in one way or another, the study of grammar will promote the efficiency of expression. If he can do this in such a way that the child will see the connection, grammar will mean something to the pupil, will have a vital relation to his life. It is to this end that the teaching of the mother tongue attempts first of all to give the child a motive for expression, — something to talk about, a sympathetic ear to listen. Improvement in expression may then follow by the gradual correction of mistakes, the imitation of correct forms, and the application of principles gained from the study of grammar.

(*c*) In an analogous fashion, arithmetic is now begun in the grades. Constructive work reveals the need of counting, measuring, evaluating, etc. This need will make the first steps rational and not arbitrary. They will take on "meaning" to the pupil, and the first condition of apperception will thus be fulfilled.

(*d*) In the preceding paragraphs, we have illustrated the development of needs of an intermediate order, — something higher than mere instincts, something less high than needs that will later be developed. Once the experiences take on a definite reference to the life of the individual, the problem of apperception is solved.

But the higher needs still remain to be developed. The child, for example, may perceive the value of grammar in improving his expression, and this may make possible his introductory study of the subject. But at a later period, he may acquire an interest in grammar for its own sake. The study of the subject may as a study satisfy a need of his life. This will obviously be a need of a purely intellectual order, a further development of the primitive instinct of curiosity.

(*e*) One might go on to show how the teacher in the elementary school may seize, at the proper moment, upon the

"collecting" instinct, and turn its force into an educative channel. Again an entire chapter, even an entire book, might be written upon the instinct of emulation and the manner in which education may legitimately utilize it. The examples given, however, will serve to illustrate the principle, and this is all that can be attempted in the present connection.

We thus see the significance of the statement, made earlier in the discussion, that the business of the school is to overlay the lower systems of apperception with those of higher degree. We must build upon the lower systems; all our work must start with these. Occasionally, too, we must return to them. There are some experiences which the child must assimilate and yet a higher need for which may be hard to find. The last resource in such cases is to fall back upon the incentive of fear. This is especially true in cases where normal development has been arrested upon the plane of play. The new methods of teaching have not entirely replaced the older and harsher methods. There are frequently points at which pulling and guiding must give place to prodding. It is safe to say that the point will never be reached where pain and drudgery can be entirely eliminated from the educative process.

13. Part I discussed the functions of education and of the school in biological and sociological terms. Part II has been concerned with a continuation of the same topic from the psychological standpoint, and especially with a development of the laws underlying the acquisition of experience. It will be the task of Part III

to determine the different modes in which experience functions in modifying adjustment, with a view to ascertaining in what manner these will affect the educative process. It will doubtless appear in the succeeding chapters that much of the matter of Part II cuts across the discussions of Part III. This is due to the fact that Part III deals with the functioning of experience while Part II has already brought out one function of experience — namely the interpretation of new experiences; hence it has already encroached upon the territory properly belonging to the former section. In return for this, Part III should throw some light upon the problems with which we have just been dealing.

PART III. THE FUNCTIONING OF EXPERIENCE

CHAPTER VII

Experience functioning as Habit

1. In the modification of adjustment, experience functions in two ways (*a*) with a minimum of consciousness, or even without consciousness — marginally or automatically; and (*b*) with a high degree or, perhaps, a maximum of consciousness — focally. Or, in other words, experience functions (*a*) as habit, and (*b*) as judgment. These terms, however, really represent the extremes of functioning; between them are all degrees and shades through which the two extremes merge into one another.

2. Any motor adjustment that has dropped into the margin of consciousness, or sunk beneath the conscious threshold, may be looked upon as a type of habit.[1] The adjustments that are involved in bicycle riding furnish a familiar example. In the acquisition of this art, new

[1] It is true that "habit," as a psychological term, cannot, strictly speaking, be applied to an unconscious phenomenon The term is here used rather in its neurological significance. Cf Baldwin's *Dictionary of Philosophy and Psychology*, art. "Habit."

and complex adjustments of the muscles must be mastered through a number of slow and tedious repetitions. Improvement is so gradual that it is often difficult to note anv change between one series of efforts and its successor; yet, in one way or another, the process is improved. Each new trial gives a new experience and helps — ever so little, it may be — to render the next trial more successful. Finally the nerve connections become so firmly fixed that the appropriate adjustment "goes off" with a minimum of attention. The slightest deviation from the position of perfect balance forms the stimulus that initiates the complex coördinations necessary to a reëstablishment of equilibrium. These coordinations come gradually to be relegated to the margin of consciousness and finally drop below the threshold. What is now the "reflex arc" at first included the cortical centers. The stimulus and the adjustment were data of consciousness. But gradually consciousness leaves the process more and more to look after itself. When the necessity for conscious control no longer exists, — when the movement can be adequately "set off" by the stimulus in this mechanical fashion, — the process is said to be *automatic*.

Automatic movement is therefore seen to be identical with reflex movement, except in this particular: it must be built up during a period of conscious control, while the latter may run its course from first to last without conscious intervention. In other words, reflex move-

ment is due to an inherited connection of elements in the nerve structure, while automatic movement is due to an acquired connection in the nerve structure, — a connection made, moreover, through the agency of consciousness.

3. The process of bicycle riding, once mastered, may go on either with a minimum of conscious intervention or entirely without conscious control. It represents, therefore, a type of the functioning of experience that may be termed unconscious or subconscious. There are, on the other hand, certain habits in which the conscious element is more pronounced. These are *marginal* habits, and they differ from automatisms in that the stimulus comes into the field of consciousness, but into the margin rather than the focus. As Stout[1] expresses it, such stimuli are "assimilated" rather than "apperceived."

"Sensori-motor" actions[2] form good examples of this type of habit. They include the multitude of little things that one does in the course of daily life — the habitual adjustments involved in dressing, eating, etc. The sight of the coat "sets off" the adjustments requisite to putting it on. The pressure upon the arms and shoulders sets off, in turn, the adjustments necessary to buttoning it up, and so on. At the table, the sight of the knife and fork suggests the movements required

[1] G. F. Stout: *Analytic Psychology*, vol. ii, p. 88.
[2] Cf. E. B. Titchener: *Primer of Psychology*, pp. 170, 256.

to take them up; the sight of the food suggests the movements that will carry it to the mouth, etc.

These may, it is true, degenerate into pure motor automatisms, but it is safe to say that they generally involve a higher degree of conscious control, certainly due in part to the fact that, while they are constant elements in daily life, they are practiced only at intervals during the day, — once or twice or three times as the case may be. If one ate and dressed as continually as one walks, the movements would doubtless become as thoroughly unconscious as are those of walking.

One who is familiar with the crowded streets of a city must have noted and marveled at the skill with which the teamsters and cabmen thread their way through the congested traffic, — with what apparent ease they guide their horses past trucks and street cars that seem hopelessly to obstruct the way, — how nicely they avoid disasters that appear to be inevitable. Yet many of these men seem to give little heed to what they are doing. Some of them, it is true, are worried and anxious, but these are in the minority. The majority sit complacently behind their horses, seemingly as careless of their surroundings as if they were upon a lonely country road Nor is this apparent carelessness without foundation in reality. So thoroughly familiar have they become with these conditions that eye and hand work harmoniously together with little effort of mind. To be sure they are alert and wide-awake, but their eyes and hands and the lower centers of the brain do the work. The foci of their minds may be occupied with far different situations.

4. Another type of marginal habit is represented by "ideo-motor" actions.[1] Ideo motor action is similar to the sensori-motor variety, except that an idea rather

[1] Cf. Titchener, *op. cit.*, pp 170, 256.

than an external stimulus sets off the accustomed adjustments. Ideo-motor habits may be illustrated by the processes of speaking and writing. Here the adjustments that are requisite to the formation of the spoken or written word follow upon the idea of the word.

The unstudied and habitual use of "good form" in speaking and writing is a type of ideo-motor habit that is especially important from the standpoint of education. If one is to speak or write effectively, *the form must be largely outside the focus of consciousness.* Proper and effective modes of combining words must be so firmly fixed by practice that attention can be given unreservedly to the "thought" or "content," with full confidence that the form will, as it were, take care of itself.

In this category belong, also, the little conventionalities of "etiquette," — those habitual adjustments that mark the person of "good breeding." These must be so fixed by constant (and, in the beginning, conscious) repetition that they will "go off" without mental effort, — that they will become "second nature."

An important general characteristic of habit is well illustrated by the examples cited. Once the process of bicycle riding has become thoroughly automatized, the bringing of the adjustments back into the focus of consciousness will seriously interfere with its efficiency. Similarly, where the movements of walking become "self-conscious," they are thereby rendered awkward and ungainly. The same rule holds with marginal habits. When one has mastered the use of correct forms of speech, attention to these forms will very likely render the expression stilted and formal.

5. *Moral Habits.* There are processes of a more complex nature that also demand treatment under the head of habit, for, notwithstanding their complexity, they still retain the essential structure of habit — a definite and uniform response to a definite stimulus or situation, involving less and less conscious effort as practice continues.

(*a*) *Habits of Cleanliness.* The old proverb, "Cleanliness is next to Godliness," expresses a world of truth from the standpoint of education. Filth is the line of least resistance; the "natural man" is an unclean man. Cleanliness is a product of civilization; it represents a certain measure of triumph over the brute. Once let the tension relax and here, as elsewhere, man tends to revert to type. This is shown in the decay of old age, in progressive dementia, and in that unnamed decay that results from the unbridled pursuit of sensual pleasures. Always there must be more or less effort involved in holding one's self to the plane represented by civilized society. The habit of cleanliness means the reduction of this effort to a minimum through a term of unceasing vigilance.

(*b*) *Habits of Industry.* Like the habits of cleanliness, these are, in their initial stages, a battle against nature. The line of least resistance is not the line of sustained effort. The natural man is the "indolent" man, — not necessarily the inactive man, but the man who is averse to sustained effort. Like the child, he is the

slave of every stimulus to change. The habits of industry represent the uniform resistance to this temptation.

(*c*) *Habits of Honor.* As with all terms of a profound nature, it is difficult, if not impossible, adequately to define "honor." Essentially it is an ideal, a conscious attitude. Habits of honor are built up through a *continued subordination* of *certain natural tendencies to* high ideals of manhood and womanhood.

The moral habits undoubtedly approach the judgment more closely than the automatisms and marginal habits previously discussed, and their treatment must be reserved for a later section, where they can be studied in the light of the principles underlying judgment.

6. *The Function of Habit.* The relation of habit to efficiency is direct. It is simple, simon-pure economy to reduce the constant and unvarying functions of life to the plane of automatism, — to take them out of the focus of consciousness and thus leave the higher centers free to deal with the changing, varying problems of existence. A man could accomplish very little if he had constantly to devote his energy and attention to the little details of everyday life. If he had consciously to adjust his muscles at every step of his walk to his office, he would have little strength left for the business of the day; and if men had always consciously to resist the temptations to unsocial and immoral action, the mere operation of physical forces would make corruption the rule and not the exception in every department of life.

If habit, then, is nine tenths of life, — as it certainly is, — the formation of habits should bear a somewhat corresponding ratio to the total task of education. The school deals with the individual during a plastic period, and it is during this period that habits of all kinds must be formed if they are to be formed most economically and effectively. George Eliot has forcibly expressed this truth in "Daniel Deronda." Gwendolen, a butterfly of society, has been thrown upon her own resources after a childhood and youth in which discipline and training found no place. She believes that she has musical talent, and she asks Klesmer, a successful musician, to help her turn this talent to financial account. Klesmer's reply sums up the pedagogy of habit in a nutshell: —

"Any great achievement in acting or in music grows with the growth. Whenever an artist has been able to say, 'I came, I saw, I conquered,' it has been at the end of patient practice. Genius at first is little more than a great capacity for receiving discipline. Singing and acting, like the fine dexterity of the juggler with his cup and balls, require a shaping of the organs toward a finer and finer certainty of effect. Your muscles, your whole frame must go like a watch, — true, true, true to a hair. This is the work of the springtime of life before the habits have been formed."

Drill, repetition, and discipline are the important words in the pedagogy of habit; but the principle that is perhaps most frequently neglected is this: *processes that are to be made habitual or automatic must first be focalized.* Not only this, but a process is automatized the

more effectively the more strenuously it is focalized in its initial stages. The law of habit building might, then, be summed up in the following formula: *Focalization plus drill in attention.*

The formation of a habit is somewhat analogous to the concentration of a solution to the point of crystallization. *One may add to such a solution increment* after increment, but unless one final increment is added, the solution will remain in the liquid state. Similarly, in forming a habit, one may go through with the slow and gradual process of repetition upon repetition, drill upon drill, but unless one final series of drills and repetitions is added, the plane of automatization is not reached.

The simplicity of the pedagogy of habit as contrasted with the involved character of the pedagogy of judgment, perhaps accounts for the neglect of this subject by educational writers. At any rate it is true that few pedagogical treatises give to habit even the smallest fraction of the treatment that its fundamental significance would seem to demand.

This neglect is reflected in certain fallacious practices that have caused an immense waste in the work of the schools. The wide application of the doctrine of "incidental learning" is a case in point. This doctrine assumed that "content" and "form" could be acquired simultaneously; or, to put it in another way, that form could be acquired incidentally while attention is fixed upon "thought" or "content." This assumption is a direct violation of the law of habit; the child can never become proficient in form without many distinct acts of attention dealing with form alone. It may be that the child will learn to spell without spelling lessons as such; that he will "absorb" the form of written and printed words while he

is reading interesting stories or writing essays and compositions. But if this is ever true, it is because attention has been divided, now being concentrated upon the form, now upon the content, and flitting from one to the other as the exigencies of the task have demanded.

Similarly, the principles of syntax and rhetorical composition may be gained through the reading of literary masterpieces and the hearing of correct forms in conversation; but whenever this miracle occurs, it is because attention has been drawn away from the content — from the thought or meaning of the writer or speaker — and concentrated upon the form. Macaulay says, "It is not by overturning great libraries, but by repeatedly perusing and intently contemplating a few great masterpieces that the mind is best disciplined." It is in the *repeated* perusal and *intent* contemplation that content is neglected and form emphasized. The essence of a good literary style lies in the very fact that the form is *not* superficial, not obvious. Like a window, it fulfills its function most effectively when it is least in evidence. If one is to gather the principles of style, then, from the study of masters, one must look deeply to find them. Mere reading for the sake of the "story," — for the sake of the content, — will not furnish them.

The doctrine of incidental learning may bring results, but it is obviously at a certain waste of time and energy. Divided attention means a breaking up of the continuity of consciousness. At each change there is demanded an overcoming of inertia, and this operates in mental work precisely as it operates in physical work.

7. *The Breaking Up of Habits.* In the work of the school, habit building frequently takes the form of replacing bad or inefficient habits with those of the opposite character. The "rooting out" of a habit follows the same law as the formation of a habit except

that the process is reversed. In forming a habit, the rule is focalization, followed by drill in attention until automatism results. A full-fledged habit operates apart from attention. If such a habit is to be disintegrated, it is necessary to bring the mechanized process back into the focus of consciousness and there to replace it with another process.

Examples of this procedure are found particularly in the language training of the elementary school. The child uses a number of incorrect and inefficient forms, — partly because he has acquired them through imitation, partly also because *language is a synthetic process*, and the pupil puts words together in combinations that he has never heard before, or, at least, never noted. Necessarily some of these forms will be crude, incorrect, and inefficient, but their continued repetition will tend to fix them as habits.

A common trick of speech among children in the early grades is the useless and awkward repetition of the pronoun after a noun: "George Washington, *he* crossed the Delaware;" "The Irish, *they* eat potatoes." Other tricks of speech that must be broken up are the use of such words as *well, why, then*, in useless connections. The wise teacher does not attempt to correct all such mistakes at once. Rather he selects a typical mistake, common to most of his pupils. This mistake he points out to them, showing in what its insufficiencies consist, and how the correct form will improve the expression, — will better subserve the purpose of communication. Then, by constant drill on this one mistake, — correcting it as quietly as possible when it creeps into the recitation, asking the pupils frequently what it is that they are trying to avoid, — he gradually replaces the erroneous with the correct form.

8. The treatment of the last section may seem somewhat unorthodox to one who is familiar with contemporary educational theory. The prominence that has attached to the factor of imitation through the writings of Tarde and Baldwin has given rise in some circles to a notion that imitation is the chief process in education. This notion has found its most effective expression in the reaction against the "false syntax" that had so prominent a place in the older grammars. There can be no doubt that this feature of grammatical instruction was carried to an unnecessary extreme; perhaps a few pupils used incorrect forms because they saw them upon the page of the text-book — although that this evil ever assumed the tremendous influence lately ascribed to it is seriously to be doubted. At any rate, it is safe to say that the child uses false syntax in his own spontaneous expression in a degree sufficient for all purposes of illustration.

But when the opponents of false syntax state that the child should never be made conscious of an incorrect form, they are repudiating one of the basal principles of growth and development. It is hardly too much to say that every man who succeeds climbs to success upon the carcasses of his dead mistakes. As one writer[1] has expressed it: "The whole process of human locomotion, not only physical but mental, is literally a series of unin-

[1] W. Hutchinson: *The Gospel according to Darwin*, Chicago, 1898, p. 12.

terrupted falls. Our only chance of advancing is to fall in the right direction and keep at it. Our only struggle should be, not to avoid falling, but to fall forward." In spite of asseverations to the contrary, it is safe to say that a principle that the history of science and the history of civilization reveal upon every page is far too fundamental to be repudiated by education.

CHAPTER VIII

EXPERIENCE FUNCTIONING AS JUDGMENT

1. THE essence of an automatic adjustment is that it *is* automatic — that it takes place in the same definite manner upon every occasion. Once an adjustment functions freely as habit, consciousness is relieved of attention to the details which habit looks after efficiently. Hence it "pays" for the individual to undergo a strenuous training in order to mechanize a large number of reactions. But experiences that are to function consciously must be treated in a different manner. They are not to be used in the same uniform fashion on every occasion. Certain experiences, indeed, that education goes to great pains to impress may function but once in modifying adjustment. Others may never function at all. Still others may function frequently in hundreds of different situations.

The problem here is obviously less simple than that which was presented in connection with habit. In the latter case, we had reference to situations that should be constant; now we must plan with reference to situations that are to be variable. In habit, the task is to make

adjustments rigid, unchangeable; in judgment, it is essential to insure the very reverse of this — to insure adaptability to different situations.[1]

2. The last chapter instanced a teamster in a crowded city street as illustrative of a man whose experiences functioned mainly as habit. It was noted that his adjustments were few and comparatively unvarying. Consequently, once his art had been mastered, it could be practiced with little effort of attention. Now and again, perhaps, a situation might present itself that would require delicate judgment, but such situations would not enter largely into his duties. On the other hand, there are some men who must solve new problems at every turn, — who must constantly apply experience in ways new and unforeseen. The situations that they face are seldom twice the same. Between these two extremes there are thousands of occupations demanding judgment in varying degrees.

Consider, for example, the captain of a steamship. Nine tenths of his time is perhaps devoted to routine duties, — to duties that are largely relegated to the field of habit. His only care in such cases is to see that the routine is faithfully kept up.

[1] "We have argued that 'reason' is our name for the process which in an objective view appears as organic variation; . . . that 'reasoning' is our name for the conscious side of those activities of our nature which enable the organism to depart from typical reactions; . . . that reason is therefore the psychic coincident of that capacity within us which is all-important in the adaptation of life to an environment which, in its very nature, must be ever-variable." — H. R. MARSHALL: *Instinct and Reason*, New York, 1898, p. 114.

As long as conditions remain normal, the ship will almost "run itself." But in the exceptional instance, — when the ship is entering a strange harbor, when an accident has disabled the machinery, when a storm renders navigation dangerous, — every increment of the captain's energy must go to the solution of the problem in hand. He must diligently search his past experience for similar situations which may help him out, he must recall and apply all the principles that bear upon the case, in short, from the experiences that he has gained in his own work, from the experiences of others in similar situations, from the general principles relating to his calling that have been derived from race experience, he must devise, construct, plan a course of action that will meet his needs. His ability to do this successfully will obviously depend largely upon the mass of experience at his command, upon his ability to recall those features that are salient to the present problem, and upon his ability to perceive the relation between what he "knows" and what he must do.

3. *A judgment is an act which results from the facing of a given situation, and in which past experience is consciously brought to bear upon the solution of this situation* As Miss Thompson[1] says: "It is always an act stimulated by some set of conditions which needs readjusting. Its outcome is a readjustment whose value is and can be tested only by its adequacy."

4. There are two important types of judgment, the distinctions between which must be carefully considered in educational theory: (*a*) the *practical judgment* involving the conscious application of *concrete* experi-

[1] Helen Bradford Thompson "Bosanquet's Theory of Judgment," in Dewey's *Studies in Logical Theory*, Chicago, 1903, pp 107 ff.

ence; and (*b*) the *conceptual judgment*, involving the conscious application of *condensed* experience.

(*a*) *The Practical Judgment.* This term has been used by Hobhouse[1] to denote the application of experience revived in its concrete form; that is, recalled in the same materials of sensation in which it originally occurred. The organism faces a situation; some feature of the situation recalls, in at least a portion of its sensory details, a similar situation previously faced. This brings with it the idea of the way in which the former situation was reacted to. Reaction is then made to the present situation on the basis of the former reaction.

Suppose, for example, that some one is severely burned and that, no physician being within call, a servant of a physician, who has helped his employer upon several occasions, is summoned. As he views the situation, he recalls a peculiarly vivid experience in which he assisted in dressing a similar burn. The procedure of the preceding case is readily repeated in this instance and the burn is successfully dressed. This is the recall of experience in a concrete, particular form. The *idea* of a single past situation is revived and applied to a similar present situation.

5. *Analysis, Synthesis, Comparison, and Abstraction in the Practical Judgment.* But this does not tell the whole story. No two situations are exactly alike; they may approach identity, but, in the nature of things, it may be assumed that perfect identity is never reached. The capacity, then, to make such a correlation of expe-

[1] L. T. Hobhouse: *Mind in Evolution*, London, 1901, ch. vi.

riences as that just cited depends upon the capacity to *analyze* an experience into its component parts, and to recognize some *relation* between similar parts of different experiences. This relation once recognized, a *synthesis* of parts of experiences is made which results in the application of the past situation to the present situation. Thus the practical judgment involves what the older logicians called analysis and synthesis as truly as does the logical judgment.

Analysis and synthesis, however, depend upon attention: in analysis, we break up experiences into their component parts, attending to one part at a time and neglecting the others; in synthesis, we recognize a component that is common to two or more experiences, raise this element into the focus of attention, and combine the two or more experiences upon the basis of this common element. This process obviously involves what the logicians term *comparison* and *abstraction*. The practical judgment rests upon the capacity to pick out the common element in different experiences, and this "perception of a relation" is a vital characteristic in all forms of judgment.

6. *Advantages and Limitations of the Practical Judgment.* An organism that can recall its past experiences and utilize them in facing new situations is obviously at an advantage over an organism that can face situations only upon the basis of instinct or habit, although there are numerous situations to which the inherited and habitual adjustments are entirely adequate. Situa-

tions that are common to everyday life, for example, are best met by an habitual adjustment, and situations that throughout the history of the race have always been critical to life are best met by hereditary or instinctive adjustments. It is well that one can dodge a missile instinctively — without stopping to "think" about it — without reducing action to the form of judgment. But instinctive and habitual adjustments, efficient as they are, require numberless experiences, either racial[1] or individual, in order that they may become fixed and certain. This process implies a tremendous waste — a constant elimination of the many forms that are unfit and the slow, long-continued selection of the few forms that are fit. In the practical judgment, however, a *single* experience may serve to insure a more adequate adjustment. Thus while the practical judgment may not work as rapidly or as certainly in a given instance as either instinct or habit, it broadens the scope of an organism's activity and requires infinitely less time to be brought to a stage of efficiency.

The *limitations* of the practical judgment are (1) the fact that it involves the recall of a particular, concrete experience; the new situation must resemble the past experience in many features, and these features must be *upon the surface;* there is no reference to underlying principles that might form a common link between

[1] This statement does not necessarily assume the inheritance of acquired characteristics.

experiences having, *superficially*, nothing in common. (2) Furthermore, the past experience must have been very recently, very vividly, or very frequently impressed in order to be revived in a concrete form. Thus only comparatively few experiences will serve as possible bases for practical judgments, because, in the nature of things, comparatively few experiences will possess either one or another of these advantages.

If man were limited to practical judgments, he would have little advantage over some of the higher animals, for experiments in animal psychology seem to indicate that some of the more "intelligent" of the vertebrates — particularly the dog, the horse, the elephant, and the monkey — can apply experience in this way, that is, they can analyze past and present experiences, pick out common qualities, and mediate means to ends upon this basis.[1] Such an animal, for instance, when placed in a cage the door of which is fastened by a peculiar clasp, will watch his master unfasten the clasp and then do it himself. This may be looked upon as a crude form of practical judgment, for it is tolerably clear that the animal perceives a relation between the experience of watching the master open the cage and the opening of it by his own efforts. It has, in other words, abstracted a common quality from different experiences, and applied this common element to the solution of a given problem.

The monkey, however, will do more than this. If the clasp

[1] The conclusions regarding practical judgment in animals are stated on the authority of Hobhouse, *op cit*, chs vi–viii See also his criticism of the views of Thorndike and others, who deny this capacity in even the higher vertebrates The conclusions regarding the operation of practical judgment in children are based upon the author's own observations and experiments.

be replaced by one slightly different, it will perceive the relation between the first experience and the new situation, or, to speak objectively, between the first clasp and the second, and modify its adjustments accordingly. If the relation is not obvious, however, — if the difference between the two experiences is too great,—the monkey will be nonplussed. In other words, its judgments are of an entirely practical order. They depend upon superficial resemblances and do not penetrate to underlying principles.

The child, in the earlier stages of his development, is limited to practical judgments. If he is confined in a yard by a rope slipped over the gate-post and one of the pickets of the gate, he may watch some one open the gate by lifting the rope, and then, if he can reach or climb to the top of the gate, he may proceed to do the same thing himself If the rope is replaced by a hoop, the new situation will offer no insurmountable difficulties The relation between rope and hoop will be readily grasped If the hoop is fastened by a peg, he may see the relation between the hoop and the peg, and pull the latter out. But if the hoop is replaced by a knob that turns a latch, he may perceive the relation between the latch and the opening of the gate, but the relation between the latch and the knob will, for some time, be too much for him. This relation is not superficial, and practical judgment is inadequate. If some one turns the knob and opens the gate, he can easily repeat the operation, but if knob and latch be replaced by lock and key, he is again nonplussed

With one of mature years, however, a situation of this sort, even if it were as thoroughly novel as it is to the child,[1] would offer few difficulties. His experiences would be much more thoroughly organized, and superficial resemblances between the

[1] This is, of course, only a supposition In reality, the situation could never be as novel to the adult as to the child See O'Shea, *op. cit*, p. 225; also E. B. Titchener *An Outline of Psychology*, New York, 1899, p 271.

present and the past situations would be less essential. We have now to inquire how it comes about that man can advance beyond the practical judgment to the operation of which the child and the young animal are rigorously limited.

7. (*b*) *The Conceptual Judgment.* Reverting to the illustration of the physician's servant and the burn, it is clear that the servant was able to treat the burn successfully because he recalled an experience in which he had helped his master treat a similar burn. The common features of the two experiences enabled him to apply the first to the second, treating the wound as successfully, perhaps, as his master could have done. But suppose the resemblance to be only superficial — suppose that the burn were of such a kind that the application of the first form of treatment to it would be inadequate. Here the repetition of the same procedure might produce the most untoward results. It is not likely, however, that the physician himself would be deceived by superficial resemblances. He would see more deeply, although he would still apply experience to the solution of the problem. Nor would the only difference be that he had *more* experiences at his command than the servant had. If that were true, the art of surgery could be acquired by an apt servant if he only remained with his master long enough. The physician, however, is trained in the *principles* of his calling, and in so far as he has his own experiences and those of his fellow-craftsmen reduced to principles and thoroughly organized, just so

far will he be likely to hit upon that experience that will help him the most in any particular case. In other words, the practical judgment of the servant will be replaced by a much more elaborate judgment, depending upon a more thorough elaboration and correlation not only of the physician's individual experiences, but also of that vast mass of race experience from which the underlying principles of surgery are drawn.

The operation of the conceptual judgment, then, involves two new factors. (*a*) It is obvious that experiences that function effectively in such judgments must be *condensed.* All the detailed experiences that bear upon a given situation cannot be recalled, each in its concrete particularity, as was the experience that the servant applied. If such a procedure were necessary, the patient would die — if not from his wound, at least from old age — before the physician came to a decision. The necessity, then, for some form of abridgment or condensation is apparent. (*b*) A vast number of experiences bearing upon a particular case implies a great diversity in the details of the separate experiences. Perhaps the point that will help the physician the most will be enmeshed in a complex of experiences that have very little superficial or qualitative resemblance to the situation in question — experiences gained in the laboratory, it may be, where their relation to the treatment of burns was never even hinted at. In brief, as experiences become massed and condensed, the relations between them

become less and less superficial and more and more penetrating and fundamental. The point of contact is no longer a surface-resemblance, but a deep, abiding, underlying *principle*, *essence*, around which the various experiences, so diverse in themselves, are clustered.

This condensation of experiences is made possible through the formation of concepts which, in a sense, take the place of, stand for, particular experiences. It is because this form of judgment depends upon the condensing virtues of the concept that it is termed the "conceptual judgment." This process of condensation and the advantage which it gives in adjustment to the environment must now be considered in some detail.

CHAPTER IX

The Condensation of Experiences and the Formation of Concepts

1. The efficiency of the conceptual judgment depends upon the condensation of experience, but this condensation is not a mere compressing, it is rather a picking out of the salient, the prominent, the significant features, and the casting aside of those features that are merely accessory. It is safe to say that an experience is never revived in its entirety. The term "concrete" is, therefore, strictly relative. It simply means that the original experience has been condensed in a minimal degree. An accurate analysis of a vast number of experiences would doubtless reveal all degrees of condensation and abridgment from what we have termed the concrete idea to the most abstract concept. The effective use of experience, however, depends in no small degree upon the extent to which it has been condensed. Concrete ideas are, at best, clumsy contrivances. They are readily recalled only under exceptional conditions; their salient features are necessarily superficial; and their very massiveness, so to speak, interferes with their effective use.

2. The practical judgment, as we have seen, implies some capacity for analysis and synthesis, and only those animals that can hold parts of experiences in a definite relation to one another are capable of making such judgments. A still higher stage of mental development is essential to the formation of a concept, because the analyses must be much more minute and the syntheses much more comprehensive. There must be capacity to look at experiences apart from immediate ends, and this, it is clear, may involve a high grade of active attention. Finally, there must be some convenient symbol that will form the link between various experiences, representing the *relation* which analysis has revealed and upon which synthesis must work. Until an animal has developed a symbolism that will permit delicate variations to represent equally delicate shades or nuances of experience, the conceptual judgment is out of the question. It is not surprising, then, that man should be the sole possessor of this prerogative.

The *word* represents the concept which, in turn, stands for a relation binding together, representing, a greater or smaller number of concrete experiences. But while words normally represent masses of experience once actualized in the concrete, they can be combined in various ways, thus making possible constructive results to which no previous experience corresponds. Man is consequently able, not only to face present situations in the light of past experience, but also to look into the

future and govern action with reference to remote ends. Thus active attention and the concept-forming capacity reciprocally benefit one another.

Hobhouse's treatment[1] of this stage of mental growth is especially clarifying. He defines a concept in the following words: "When an element common to many experiences is not merely recognized when it appears, but (1) is thought of without being perceived, and (2) is capable of being combined in thought with other elements, it becomes a concept of general meaning and application. To be a general concept, the element must be something for consciousness apart from its perceptual setting, and it must be applicable to a different setting."

3. Concepts have been variously classified by various authorities. While it is not pertinent to our purpose to review these classes at this time, it will be helpful to consider briefly two of them for the sake of the light that they throw upon the nature of the concept in general.

(*a*) *Collective Concepts.* These are represented in language most typically by the common nouns. Having the capacity for analysis, we are enabled to "know" objects as definite parts of experience. Certain objects have certain features in common. They may differ in many respects, but there is something that combines them into a class. This constant common quality we perceive as a relation and represent by a name. Thereafter we are enabled to deal with the name, — to use the name, — as representing the class, as standing for a mass of similar experiences.

It is clear that the greater the number of objects included under the concept, the fewer will be the common qualities that the concept connotes, and the more "abstract" will be the

[1] Hobhouse, *op. cit.*, p 292.

relation that is designated. The spreading-out of the concept over a number of individual objects is technically known as its *extension*; the common qualities that it represents form its *intension*. Therefore the extension and intension of a collective concept always bear an inverse relation to one another, — the greater the extension, the less the intension, and *vice versa*. The concept *horse*, for example, possesses more intension and less extension than the concept *vertebrate*, and so on. This distinction is somewhat important from an educational standpoint.

(*b*) *Individual Concepts*. These are typically represented by particular names or proper nouns.[1] That such words stand for condensed experiences is, perhaps, not obvious at first glance. Formal logic has accustomed us to think of the concept as something abstracted from several *objects*, rather than from several *experiences*. But it is plainly apparent that our knowledge of an object varies with our experiences with that object.

For example, my friend, Mr. Smith, is an individual, but my knowledge of him is a product of several experiences that I have had with him. My concept of Mr Smith, represented by his name, is really a condensation of these experiences. I have seen him at different times, talked with him upon different subjects, gained thereby an insight into different phases and aspects of his "nature." My concept has gradually changed during all this time. Particulars and details have been cut out, and only permanent features remain. These constitute a thread of continuity or identity running through the details of various experiences, and to this thread I attach the symbol, his name.

[1] "The individual marked by a proper name is a universal Any individual man, John Jones or Richard Roe, is a unity of manifold states, qualities, activities, and relations. . . The proper name marks the connecting unity." — BALDWIN AND STOUT, in *Dict. of Philosophy*, etc., art. "Conception."

Perhaps there will come up with his name, when I speak of him or hear him spoken of, an image of his face, perhaps even a picture or image of him, as he appeared at some particular time and place. But if one or another of these "constant associates"[1] does occur, it is, to all intents and purposes, what the name is, — a symbol. If, for example, my constant associate with Mr. Smith's name is an image of him as he appeared at a social gathering, and if this is revived when I speak of him as being seriously ill, my meaning will not be obscured, although intrinsically the idea of serious illness would seem naturally to require an image of him as he would appear in the sick room, rather than an image of him at a social gathering. But the use of a concept in a judgment does not necessarily involve any definite and consistent imagery which would, in itself, represent that judgment. If it did, the capacity for condensing experience would mean very little to mental development.

4. *The Concept of Self.* One of the best examples of the individual concept is the concept of self. The mental content represented by the pronoun *I* is just as thoroughly a product of condensation as is the concept of any other individual. I have a social self, a family self, a professional self, and, in virtue of my inherited tendencies, a primitive self. Each of these represents, in a certain measure, a distinct individual. I have different attitudes, different dispositions, different ways of looking at things, according as one or another of these subordinate selves is dominant. But all through these subordinate concepts there runs a thread of unity. Some-

[1] See W. C. Bagley, in *American Journal of Psychology*, 1900, vol. xii, p. 120.

times, perhaps, this may be a very slender thread and, in pathological conditions, it may be broken off altogether. But normally it is a thread which, in spite of whatever efforts one may make at modesty, is bound to be the largest and most comprehensive of one's concepts. It is with reference to this ultimate self that all the activities of one's life are ordered, either explicitly or implicitly. Morality has been termed the subordination of individual impulses to remote social ends; but morality is possible only when these social ends can be identified with the highest and most permanent interests of the ultimate self.

5. *Concepts and Apperceptive Systems.* An apperceptive system was defined in an earlier chapter [1] as a mass of experience functioning in a condensed form. There is an obvious correspondence between the subordinate concepts of self, mentioned in the last paragraph, and the larger apperceptive systems discussed in the earlier chapter. Not only the concepts of self, however, but every concept is an apperceptive system; *a concept is an apperceptive system made explicit — made self-conscious.* In the process of simple apperception, the operating systems are in the background or margin of consciousness; in the process of judgment, which is only a more complete, more elaborate form of apperception, the operating systems are brought into the foreground. In the conceptual judgment, the apperceptive

[1] Ch. v, above.

systems are, for purposes of convenient representation, attached to words or symbols. *The word thus becomes the focal representative of the apperceptive system.* One can deal with the word or concept precisely as one could deal with any of the concrete experiences from which it has been derived if the latter were represented consciously by its original sense ingredients.

It should not be forgotten, however, that back of the word is the marginal "halo," or fringe of relations, which "carries the meaning," and in which the kinæsthetic sensations, representing as they do the constant factors in experience, occupy a prominent place *Except from the standpoint of genesis*, however, these marginal elements may be largely left out of account; one may deal with words precisely as if they were, as they seem to be, the *sole* representatives, — the attenuated shadows, — of the original experience. But the standpoint of genesis is the very standpoint with which education is concerned. It is our business to know how these apperceptive systems are formed and how the words that represent them come to function effectively.

Professor Gore[1] emphasizes clearly the importance of the marginal residua of past experiences · "The conceptualist has contributed to the data of descriptive psychology by calling attention, by implication at least, to the remote and reduced character of the imagery which may characterize thinking. But it by no means follows that the more remote and reduced the sense-content of an image becomes, the less important is that sense-content for thinking, the less demand for discrimination. On the contrary, the sense-content that remains may be of supreme logical importance. It may be the quintessence of

[1] W. C Gore. "Image and Idea in Logic," in Dewey's *Studies in Logical Theory*, pp. 201–202.

meaning. It may be the conscious factor which, when discriminated from another almost equally sublimated conscious factor, may determine a whole course of action. The delicacy and rapidity with which these reduced forms of imagery as they hover about the margin of consciousness or flit across its focus are discriminated and caught, are points in the technique of that long art of thinking, begun in early childhood. The fact that questionnaire investigations — like that of Galton's, for example — have in many instances failed to discover in the minds of scientists and advanced thinkers a rich and varied furniture of imagery does not argue the poverty of imagery in such minds; it argues rather a highly developed technique, a species of virtuosity, with reference to the sense-content of the types of imagery actually in use."

To put this in another way, one may say that, in the early years of childhood, the words used are always associated with concrete imagery. In adult life, also, in dealing with unfamiliar subjects, the tendency to supplement the word with concrete imagery is very strong But with practice in the use of words, the imagery becomes more and more schematic, more and more symbolic, more and more representative and connotative, until a point is reached where the expert in a certain field images very little, perhaps not at all so far as he can discover.[1]

6. *Concept Building in Education.* An important task of education is to lead the pupil to condense his experiences and attach symbols to the concepts thus formed. The fundamental principle that governs this process

[1] See, in this connection, Titchener's remarks upon the word idea *Outline of Psychology*, New York, 1899, pp 309 ff, H M Stanley "Language and Image," in *Psychological Review*, 1897, vol iv, p 71, G. F. Stout *Groundwork of Psychology*, New York, 1903, ch x, W. C. Bagley. "Apperception of the Spoken Sentence," in *American Journal of Psychology*, 1900, vol xii, p. 119.

has been recognized almost from the beginning, — recognized in theory but often sadly neglected in practice. This principle is formulated in the pedagogical maxim: "Proceed from particulars to generals and from the concrete to the abstract." Rightly interpreted, this dictum lies at the basis of all rational instruction. It means that there is no way to reach concepts that will function efficiently, save through a series of experiences beginning with the concrete and particular and passing gradually through the various stages of condensation. There is no "royal road to learning," and there is no short cut to the concept.

But the principle must mean concrete and particular *experiences* and not necessarily concrete and particular *objects*. Mind passes "naturally" from particulars to generals, if one means by these terms particular experiences and general concepts. But the term "particulars" must not be confused with the term "details." Mind does not move normally from details to masses; it does not work synthetically alone, but first analytically and then synthetically. The concrete experience in the first place is vague and homogeneous; by the operation of analysis and synthesis it is made definite and heterogeneous. The large, undifferentiated mass is the beginning; the large *unity*, made up of connected and interrelated parts, is the terminus.

The vague, undifferentiated masses or wholes which constitute concrete experiences are technically termed

"aggregate ideas." Any given situation of which perception informs us is a type of the aggregate idea. We break it up into parts, perceive relations between these parts and similar elements of past experience, and form a judgment, a synthesis. Obviously we can do the same with an ideal experience as well as with the real perceived situation. We may have in mind an aggregate made up entirely of old materials and subject it to analysis and synthesis in a similar manner. The term "aggregate idea" is a convenient designation and will be frequently employed in the subsequent discussions.

7. The duty of the teacher in the process of concept building is to see to it that the process of condensation is not taken for granted, but actually worked out. The individual must be subjected to a number of experiences of the concrete order and led consciously to make the analyses, comparisons, and abstractions that are necessary to the formation of the concept.

Consider, for example, the concept *river system*. By the approved method of teaching geography, a single river system is studied as a type. If possible, this will be one with which the pupils can deal directly, of which they can have first-hand knowledge. If this is the case, they will observe the various features of the river system from as many points of vantage as possible. They will represent what they see in various ways — by drawing, by modeling, by picturing, by describing From all their experiences with this typical river system, they will gain somewhat of a "general" idea — a condensed experience. But this idea will have been condensed from *experiences*, not from *objects*. For a long time they will deal with one river

system; yet, when the term is applied, it will represent a concept just as truly as if they had compared a hundred different river systems, abstracted the common qualities, and built up the general notion in the highly artificial manner described in the older treatises on educational psychology. Certainly this typical river system will be compared with others as geographical instruction continues, and the concept will be gradually extended, losing, at the same time, some of its intensive characters. The point that is to be emphasized in this connection, however, is that the pupil may gain a working concept through the study of a single type.

The grievous error of the older method of teaching arithmetic was, that it *assumed the concepts of number* and dealt entirely with the symbols that represent the concepts. This naturally led to a barren formalism in instruction, — a formalism to which number symbols lend themselves all too readily.[1] Certainly one who has constantly to deal with numbers must come in course of time to manipulate figures with little conscious reference to their concrete bases. But one who would effectively use number concepts in this fine degree of condensation must first build up these concepts through a long series of concrete experiences with the particular data that they represent.

It is in arithmetic that this danger of neglecting to pass through the preliminary stages of concept building is most clearly revealed, but other subjects of instruction have not been free from the blight of formalism. The "memoriter" method of learning geography, grammar, and history is even now all too common. Learning words "by heart" still has its place in education, but its sphere is restricted, and the process must be rigidly subject to certain general principles that will be discussed in a later section.

[1] How the introduction of the Hindu system of notation, convenient and time-saving as it proved to be, opened the way for formalism in arithmetic teaching is clearly shown by Professor D. E. Smith: *Teaching of Elementary Mathematics*, New York, 1900, ch. iv.

8. *To summarize:* (*a*) The process of condensation must work through concrete experience. (*b*) The effective use of the word as the focal representative of an apperceptive system is conditioned entirely upon the faithfulness with which the details of this condensing process have been carried out. (*c*) For some time the word will tend to be supplemented by more or less concrete imagery revived from the particular experiences to which it is referred. (*d*) The most effective use of words, however, demands that this concrete imagery be reduced to a minimum; that the sensory components of the apperceptive system retire to the margin of consciousness; and that the word become the sole focal representative.

PART IV. THE ORGANIZATION AND RECALL OF EXPERIENCE

CHAPTER X

The Organization of Experiences through Conceptual Judgments

1. It has been pointed out that judgment is essentially an adaptation, an act; and this is true whether the judgment be of the practical or of the conceptual type. The physician who solves the situation with a conceptual judgment uses his experience as an instrument for directing adjustment just as truly as the servant who solves the situation with a practical judgment. In the latter case, experience is recalled in a concrete and particular form; in the former case, it is recalled in a condensed and symbolic form.

Not only real situations, however, but also ideal or imagined situations may be solved by a process of judgment. The physician may have a fairly accurate report of the case before starting from his office, and on his way he may picture the situation and arrive at practically the judgment that he would have reached had he waited for the real situation to be presented. Or, in his earlier days, he may have "thought out" an imagi-

nary case of a similar nature and arrived at a judgment that could afterward be applied to a real situation. Or, again, he may have looked up the matter in a surgical treatise before leaving his office and appropriated the conceptual judgment which the author of the treatise recommended as a solution of such a situation.

In other words, *the finished product of a conceptual judgment may itself function as a condensed experience in facing new situations.* The average man has at his command a number of judgments already made. He has come into possession of these in various ways: some he has worked out for himself, some he has gained in social intercourse, some are due to his reading. *How* he has gained them we shall find to be a very important factor in their effective use. In the present connection, however, it is enough to know that they can be used. The repeated application of a "preformed" judgment, however, does not involve so complicated a process as that required for its first elaboration. Indeed the application of these preformed judgments may frequently approximate the operation of habit. Inasmuch, however, as the process is normally focal, it may be termed a judgment; that is, the application of a preformed judgment to a given situation is in itself a judgment, for it is the conscious application of past experience to a present problem.

2. *Reasoning.* This distinction furnishes a basis for an adequate definition of *reasoning.* Essentially, it is

the formation of a judgment "out of the whole cloth," — the solution of a new experience in an entirely new way. The physician of long practice will make a rapid examination of the condition in which he finds his patient and immediately come to the judgment, "This is malarial fever," or "This burn must be dressed with a dry bandage." The thinking, the reasoning, that such a process involves is scarcely more strenuous than that of the layman who casually remarks that it is a fine day. But somewhere and at some time the physician had to go through a severe course of reasoning in order to arrive at such a judgment. Even now, in very novel or very critical cases he would do so.

It is very easy to become confused upon this point. Formal logic recognizes syntheses of subjects and predicates as judgments, and syntheses of judgments as reasoning, whenever certain formal conditions are fulfilled. Any grammatical sentence fulfills such conditions, therefore any grammatical sentence may be looked upon as a judgment. To the psychologist a grammatical sentence *may* represent a judgment, but this does not in the least imply that the capacity to put words together grammatically means the capacity for judgment.

This point is well brought out by Professor Titchener[1] in the following paragraph: —

"Man has dubbed himself *homo sapiens*, and defined himself as a 'rational animal'; but he rarely thinks. For we are, all of us, born into a society where judgments await us ready-made; every generation receives a heritage of judgments from the preceding generations. Hence facts that cost our ancestors immense pains to work out come to us as a matter of course.

[1] E. B. Titchener: *Primer of Psychology*, p. 217.

Society is already organized; then we do not need to make judgments about social organization. A form of religion is established; we need not judge for ourselves in religious matters. A code of conduct has been laid down; we need not judge in matters of conduct. The applications of scientific principles are seen all about us, — we may take the steam-engine and the telegraph for granted. Life is made smooth for us by the accumulated work of past generations. . . . It follows from this that propositions like, 'The grass is green' are not judgments at all; they do not express results that we have gained laboriously by active attention."

Miss Thompson[1] has also called attention to this distinction: "A large portion of the so-called judgments considered by logicians, even by those who emphasize that a judgment is an *act*, are really not judgments at all, but contents of thought which are the outcome of judgments — what might be called dead judgments, instead of live judgments. When we analyze a real act of judgment, as it occurs in a living process of thought, we find given elements which are always present. There is always a certain situation which demands a reaction."

3. Reasoning, then, in the strict sense of the word is a relatively rare process and occurs only in the formation of a judgment *de novo*. In the great bulk of our daily activities, we apply ready-made judgments to the situations presented, rather than analyze the situations and form therefrom entirely new judgments. In the former case, however, there will be something of the *process* of judgment, only much less complex than the more elaborate process for which the term "reasoning" has been reserved. A term is needed, therefore, to cover this

[1] Helen Bradford Thompson, *op. cit.*, p. 108.

application of preformed judgments to given situations, — a term that will cover the middle ground between the automatic functioning of experience as habit and the maximally conscious functioning of experience as reasoning.

Professor McLennan[1] has used the term *intuitive judgment* to designate a class of this intermediate type. This class is exemplified in the manner in which an expert responds to a situation as contrasted with the reaction of a novice or a layman.

"To the intuitive judgment there is no hesitation, no aloofness. Action is direct, but entirely self-conscious. That such a type of judgment as the intuitive exists, there can be no doubt. There is all the difference in the world between the quality of consciousness of a mere layman and that of an expert, no matter what the line. It is a process whose parts are successive, whether much or little difficulty be experienced. For the expert situations are taken in at a glance, parts and wholes are simultaneous and immediate. Yet the meaning is entirely exact. The expert judgment is self-conscious to the last degree. While other individuals are thinking out what they do, the expert has it, sees the advantage, adjusts, and moves. Demand and solution jump together. . . . Only in so far as we become experts in our special fields of experience, and have reduced our instruments of action to precise control, can we expect the presence of intuitive judgments. They remain, therefore, as the final outcome of the judgment-function made perfect in its technique and use."

The term *intuitive* seems to be an excellent designation for this type of judgment, for it implies that the

[1] S. F. McLennan: "Stages in the Development of Judgment," in Dewey's *Studies in Logical Theory*, pp. 139 ff.

process has a certain resemblance to habit. It differs from the judgment of reasoning, — which Professor McLennan aptly terms "reflective," — in that the intervening stages of analysis and synthesis have been left out or reduced to a minimum — the "reasoning" has been eliminated. As the author puts it, "Demand and solution jump together," "Situations are taken in at a glance, *parts and wholes are simultaneous and immediate.*" The term seems thoroughly adequate also to cover the application to existing situations of most of the preformed judgments gained through social heredity, — the commonplaces of everyday conversation. This is the field where we are all experts, as it were; or, at least, where only little children and savages are laymen.

Professor McLennan would doubtless prefer to identify these last-named judgments with what he terms the *impersonal* type. But, as he points out, there is a clear resemblance between the impersonal and intuitive forms; and, inasmuch as the multiplication of technical terms must be avoided as far as possible in a work of this kind, it may be safe to neglect the differences, and to consider the two forms as identical.

4. *The Aggregate Idea in Reasoning.* The process of true reasoning — the formation of a judgment *de novo* rather than the application of a preformed judgment — involves what has already been referred to as an "aggregate idea." This is a more or less vague, more or less undifferentiated mass, represented in consciousness by concrete sense materials, "tags" of meaning, disconnected con-

cepts, and, if one is facing a real situation, a complex of perceptual elements. The process of reasoning consists in "working over" this mass in active attention, analyzing it, discovering the relations that exist between its several parts, and reconstructing the whole in a definite judgment or series of judgments.[1]

5. *Logical Reasoning.* Sometimes the materials of the aggregate idea consist entirely of preformed judgments. The task is then to arrange these judgments in logical order, — that is, in the order that reveals at a glance the relation between them, — and to express this relation in the form of a new judgment. All this may, of course, be done for us and we may simply borrow the result, but, in case we do it for ourselves, we are performing an act of logical reasoning; *and this holds true whether the judgments with which we deal have themselves been borrowed or whether we have worked them out for ourselves from still simpler data.*

6. Logical reasoning assumes two general forms: *induction* and *deduction.* In a process of *inductive reasoning*, one passes from a number of particular judgments to a more general judgment; one recognizes in the particulars a common principle which one *abstracts* and *generalizes.* The process is similar to that of the formation of concepts, except that here one deals with *con-*

[1] A very good illustration of a process of true reasoning and the reduction of an aggregate idea is cited by Titchener: *Primer of Psychology*, p. 217.

densed experiences of a particular nature, rather than with concrete experiences.

The formation of any great principle of natural science will illustrate the workings of inductive reasoning. Take, for example, the law that eighteen inches of rainfall annually is the minimal amount that will support agriculture without artificial irrigation. This is a generalization drawn from a number of particular judgments regarding the influence of rainfall upon agriculture in thousands of particular instances. Agriculture was attempted in this place with sixteen inches of rainfall; it proved a failure. In another place, seventeen inches were available, but results were not obtained. In this locality, twenty inches of rain fell during the year; agriculture was carried on successfully with careful cultivation. Nineteen inches gave similar results. With eighteen inches, let us say, the number of successes just overtopped the number of failures. Hence the general law. All the important principles of science have been gained largely in this way. The principle of gravitation and the law of evolution are perhaps the most notable examples.

In the work of education, we make frequent use of inductive reasoning. Take, for example, the simple experiments performed in nature study. The teacher wishes to develop in his class the general principle that the germination of seeds depends upon moisture and warmth. A number of boxes are provided, in each of which similar seeds are to be placed. Two boxes are filled with damp and dry loam, others with damp and dry sand, others with damp and dry sponges, others with damp and dry blotting paper. A duplicate series of boxes is prepared in precisely the same way. One series is placed in a warm room, another in some place where the temperature is close to the freezing point. The children observe the behavior of the seeds under these various conditions. Each box represents, as it were, the center of an aggregate idea, out of which, in the course of time, the pupils will make one of these judgments:

"The seeds in this box germinate in damp sand;" "These seeds do not germinate in dry sand;" "These seeds germinate in damp sand in a warm room;" "These seeds do not germinate in damp sand in the cold," etc Finally, these particular judgments are put together in the more general judgment, or principle: "Moisture and warmth are necessary to the germination of seeds." In a similar manner, the negative judgment, "Darkness is not necessary to the germination of seeds," or the judgment, "Light, warmth, and moisture are essential to the growth of green plants," may be reached, each representing a definite act of inductive reasoning upon the basis of particular judgments formed from actual observation.

7. *Deductive reasoning* proceeds from a general judgment to an individual or less general judgment. In a sense, it is an explicit application of a principle covering a large number of particular cases to one of the cases which the principle covers. It is represented schematically by the well-known formula of the syllogism: —

M is *P*,
S is *M*;
therefore, *S* is *P*.

Or, as it is worked out in the classic example: —

All men are mortal;
Socrates is a man;
therefore, Socrates is mortal.

Deductive reasoning subserves two very important functions in the economy of life: (*a*) the function of *explanation* or *solution*, exemplified when one identifies an object of experience as a member of a still larger class, or recognizes a process as the expression of a more gen-

eral law; and (*b*) the function of *anticipation* or *prediction*, exemplified when one makes a judgment about some situation with which direct, sensuous experience is impossible, or in the solution of which the formation of judgments from direct experience would be a slow, laborious, and unprofitable process.

The first function is really a process of apperception, in which all the operating apperceptive systems are made explicit. A situation is presented which baffles the individual for the moment. He does not know what to do with it, how to relate it to the needs of his life. He studies it carefully, however, and finally identifies it with a group of other similar phenomena which are described by a certain law or principle. Immediately the situation "clears up." The operation of that particular principle has a definite and well-known relation to his life. The mystery is solved and the appropriate adjustment results. The process is quite similar to simple apperception, except that it is long drawn out and thoroughly self-conscious in all its details.

The second function of deductive reasoning is illustrated typically by the discovery of the planet Neptune. The planet Uranus had been observed for several years, and its position at successive periods of any given year could be predicted with mathematical certainty. But in the course of time it happened that Uranus failed to act according to the astronomers' calculations. John Couch Adams argued that the apparent aberrations in the planet's course were not due to an error in the previous calculations, as many supposed, but to the presence of another planet beyond Uranus. During the same year, Leverrier reached a similar conclusion, maintaining that, by all the known laws of celestial mechanics, the behavior of Uranus could be explained only by assuming the existence of a large planet beyond. He even went so far as to compute the orbit

of this hitherto unknown planet from the data furnished by Uranus, and in the following year (1846) the planet Neptune was revealed by a new and powerful telescope within 1° of the point indicated.

8. The great majority of the judgments with which education furnishes the individual are useful only under the condition that they may be made the bases of deductive reasoning; and the paramount problem of educational method is to determine how these judgments are to be imparted in order most efficiently to function in this way. It will do the pupil little good, for instance, if, after learning that eighteen inches of rainfall are essential to agriculture without irrigation, he joins in the next wild rush to populate a semi-arid region — such a migratory movement, perhaps, as that witnessed in the "boom" days of western Kansas and Nebraska. It is one function of education to prevent just such blunders.

9. *The Organization of Judgments.* When a vast number of experiences, having reference to some definite phase of life, are reduced to judgment form, correlated with one another, and combined into a system, there results a "body" of knowledge or a *science.* Thus every science, such as physics, botany, sociology, is a body of organized and interrelated judgments gained from thousands of different experiences or drawn from more general judgments which, in turn, rest upon experience.

But this organization and systematization of judg-

ments, no matter how elaborately it may be worked out, still has as its end or purpose the modification of adjustment. Improvement in the organization of facts and principles means that they are more closely related to one another; that, instead of being "massed," they are shot through with a multitude of connections; and that, in virtue of these connections, they may be recalled most readily and applied most effectively. The aim of each science is to arrange its judgments in a system, the component parts of which shall harmonize perfectly with one another.

As Hobhouse[1] points out, what we term "common sense" differs from scientific thought in this respect. Common sense cares nothing for fine distinctions that do not subserve immediate practical ends. If a law or a principle "works," that in itself is sufficient. That laws or principles may be logically inconsistent with one another fails to be a disturbing factor. But a science seeks to put *all* the judgments relating to its special province into a consistent and coherent whole. If they do not harmonize, their premises must again be sought out, subjected to new and more rigid analyses, and resynthetized. Hence, as science develops, more exact and more refined methods of attacking the aggregate idea come to be applied. There is greater nicety of analysis, greater accuracy in comparing, measuring, weighing, greater care in drawing conclusions, either inductively or deductively.

All these refinements of method may look, on the surface, to be remotely removed from what one terms "practical" ends. One speaks of the efforts of science to build up coherent systems of knowledge as "theoretical." In the universities, there

[1] L. T. Hobhouse, *Mind in Evolution*, pp. 329 ff.

are scores of investigators who spend their time over what seem at first glance to be the most futile problems, — problems that appear to have not the slightest significance to the vital questions of life. And if we ask these investigators why they spend priceless time in solving impractical problems, they will tell us that it is all for the sake of truth, and that they care nothing for the "common-sense" estimate of their work.

But truth is only another name for a consistent system of judgments, and no system that presents gaps or lacunæ can be thoroughly complete. Facts and principles which may not have a *practical* value in direct application to the situations or problems of life may still have a *theoretical* value in bringing nearer to perfection a system of knowledge. The history of civilization sufficiently demonstrates that experience is most effectively applied when it is formulated in such a system; hence judgments that have only a theoretical value at the outset may ultimately, through devious channels that escape our view, find a useful and timely application to the pressing problems of existence.

10. Philosophy, which may be called the science of sciences, is popularly supposed to be the most "impractical" pursuit to which the energies of man can be given; for, while a science may bring forth some detailed judgments that find immediate practical application, philosophy is entirely concerned with making the various sciences consistent with one another and in tracing out the fundamental postulates upon which all knowledge rests. Its goal is the coherent organization of all knowledge. Yet the fact that improvement in organization yields practical results in the various special sciences justifies our faith that a still wider improvement of

organization which aims to bring all the facts and principles of all sciences into a coherent system will work an influence on practical life commensurate with its comprehensive character. Thus, though philosophy "bakes no cakes," as the ancient proverb reminds us, its influence may still operate to render even the baking of cakes more efficient.

The work of Herbert Spencer, dealing though it did with abstract and theoretical themes, revealed the principle of evolution as the one permanent essence in all our experiences with nature, with mind, and with society. The recognition of this principle has had the most profound effect upon the practical affairs of life. There is scarcely a field of human labor that it has not modified. Agriculture has been revolutionized, medicine has been founded upon a new and firmer foundation, and even government and practical politics have felt its influence.

11. The fact that the organization of experience in coherent systems is a fundamental factor in promoting the application of experience to the practical improvement of adjustment is profoundly significant to the process of education.[1] A large number of the judgments that education impresses will serve, not so much in direct application to the needs of life as in cementing together the various parts of a coherent body of knowledge. But the educator must never lose sight of the fact that his work is ultimately to be measured and judged by practical standards; ultimately all knowledge must have practical worth. Simply because a mul-

[1] Cf. L. F. Ward: *Dynamic Sociology*, New York, 1897, vol. ii, p. 542.

titude of stages may intervene between the assimilation of experience and its outcome in action, one must not be deceived into believing that mind exists for any purpose other than the modification and direction of adjustments. Nature does not provide luxuries that subserve no purpose; and a mind that assimilated knowledge for its own sake would certainly be such a luxury.

But while education must recognize this standard, it will still be untroubled by the popular clamor for the "practical." It will understand that practical ends are sometimes best subserved by seemingly impractical means, and that, in ways far beyond the ken of "common sense," the judgments which that common sense derides as purely theoretical may converge upon and improve even so prosaic a task as digging a ditch; for just as no fact is so small that theoretical science may neglect it, so no human duty is so mean or lowly that this same theoretical science may not enlighten and ennoble it.

It is not to be inferred, however, that the individual who assimilates knowledge is necessarily conscious of the ultimate function which this knowledge is to fulfill in his life. One must distinguish carefully between the ultimate value that education may see in subject-matter of instruction and the interest that the individual may have in this subject-matter. The investigator may work solely and simply from an abstract love of truth, taking no thought whatsoever of even the indirect bearing of his conclusions upon practical life. Further than this, the love of truth may be only an empty phrase to him, and the

real motive that keeps him to his work may be a mere delight in that particular form of activity called investigation, — an acquired interest, growing directly out of the primitive instinct of curiosity. Viewed from the subjective standpoint, the satisfaction of this interest is a commendable end in itself, — but, from the social standpoint, it is commendable only because experience has proved that society is, in the long run, the gainer if men are permitted to investigate for the sake of investigation In other words, investigation is an individual interest that society confirms as ultimately promoting social welfare.

12. In the discussion hitherto, the terms *fact*, *law*, *principle*, *generalization*, have frequently recurred. It is well to have a definite connotation for each of these terms. A *fact*, for our purposes, is a judgment of the particular type, representing, one may say, the solution of an aggregate idea made up largely of concrete sense-material. In the illustration cited above, the judgments, "These seeds germinate in damp sand," "These seeds do not germinate in dry sand," are facts. The terms "generalization," "law," and "principle" may be looked upon as synonymous. Each represents the statement of a relation that is constant in a number of separate facts. Thus the judgment, "All seeds require heat and moisture for germination," is a generalization, a law, or a principle. In view of its universal validity, it is also known in logic as a *universal judgment.* A judgment that is drawn from a comparatively few facts and inferred to cover a much larger number is termed a *hypothetical judgment*, or a hypothesis.

The organization of judgments into systems of knowledge also gives rise to some technical terms that should be used in a definite manner. An investigator working in a special field of knowledge generally confines his constructive efforts to a very small corner of that field. He attempts first to discover facts and then to work these facts up into principles or generalizations of a comparatively simple nature. The written or printed record of such investigations, together with the conclusions that he draws from them, is termed a *monograph*, and the investigator himself is a *specialist*. A second corps of workers might analogously be called *generalists*. They work over the facts and principles brought out by the specialists and attempt to put these together in a coherent system.[1] The record of their work is termed a *treatise*. Finally, there is a third class of workers who deal with the relations of the several sciences to one another and to life in general. These are the philosophers, and their writings as works of philosophy fall into several subclasses. In addition to all these, there are men who sum up in brief form the main facts and principles in the larger fields and produce *text-books*. A text-book may take the form of a treatise, but, as a rule, it is a compilation from a number of treatises and aims at brevity and simplicity of treatment.

The principle of compensation would suggest that a high degree of efficiency in more than one of these lines would be

[1] Hence the term *systematist* is often used as a synonym of *generalist*.

exceptional. This inference is strongly confirmed by experience. There seems to be a distinctive type of mind that is either adapted to or developed by specialized research, and unusual ability along this line seems quite to preclude even mediocre attainments in philosophy and system. Occasionally we find a man, like Darwin or Wundt, who is an exception to this rule; but, in general, the scientists are poor philosophers, and the philosophers are rather less than indifferent scientists.

CHAPTER XI

The Factors of Efficient Recall

1. The functioning of experience in consciousness is characteristic of all forms of judgment, and whatever is to function effectively in consciousness must be capable of revival or recall. This implies that the factors which condition the revival of experience will be of extreme importance from the educational point of view.

2. (*a*) *The Recall of Concrete Experience.* Psychological investigation [1] has shown that ability to revive concrete sense impressions involves one or more of four separate factors: (1) recency, (2) primacy, (3) vividness, and (4) frequency.

(1) The more *recently* an impression has been made, the more likely it is (other things equal) to be brought up again in consciousness. This is, of course, a matter of commonplace knowledge and needs no demonstration. From an educational standpoint, however, recency is not an important factor in recall, for the obvious reason that education works toward a comparatively remote end. In a negative way, it is important to know that mere "cramming" may produce the most deceptive results,

[1] See particularly Mary W. Calkins: "Association," in *Psychological Review Monograph Supplements*, 1896, vol. i, no. 2.

and that measures must be taken to check the operation of this factor to the subversion of the true purpose of education.

(2) *Primacy*, as a factor of efficient recall, finds expression in the popular phrase, "First impressions are lasting." It is the new thing that "catches the attention." We remember in great detail the events of our first coming to a certain town or to a certain school. The remaining events of our stay may be vague and shadowy enough, but the initial impressions stand out clear and distinct. As with the factor of recency, education is concerned with primacy in only a slight degree. First impressions color later experiences, hence it is always well to make one's introduction to a subject of study or a line of work as pleasant and agreeable as possible. Not a few individuals have probably been effectually discouraged from that persistent effort which is everywhere essential to success by some unpleasant occurrence at the outset which tinges all future endeavor.

(3) The value of *vividness* in promoting recall is likewise a matter of commonplace knowledge. We remember experiences that have, for one reason or another, made a "deep" impression upon our minds. A serious accident or an exciting episode is likely to be retained indefinitely, even to its concrete details. Needless to say, however, impressions are vivid because of their contrast to other impressions that lack this characteristic; hence not all impressions can be given this advan-

tage. Furthermore, vivid impressions mean an abnormal nervous activity, hence a multiplicity of such experiences would doubtless promote a nervous breakdown. This is seen very plainly among those who live for some time under conditions of great excitement.

Notwithstanding this disadvantage, however, the factor of vividness is extremely important in education. If the child is to be corrected for a serious fault, it is necessary to make the experience of correction as vivid as possible in order absolutely to insure an inhibitory effect in the future. Vividness is also important in the early stages of education, when the child is still under the sway of passive attention and must be appealed to through stimuli that solicit passive attention. With advancing age, the individual becomes less and less dependent upon these primitive means of holding the attention. To make an extensive use of "spectacular methods" at this time is to appeal to the lower apperceptive systems, to the primitive interests; and persistent use of such methods cannot fail to weaken the individual.

(4) *Frequency*, as a factor of efficient recall, is a synonym for repetition. As we have seen, it lies at the basis of the pedagogy of habit, but it is not without importance in the pedagogy of judgment, and especially in that form of judgment that lies between habit and reasoning and which we have termed "intuitive." The factor of frequency will be discussed in greater detail later on.

3. These four factors of efficient recall have important relations to attention. Attention increases the vividness of an impression. Vividness and frequency, in so far as their effects are concerned, may be said to bear an inverse relation to one another. Other things equal, the less vivid the impression, the greater the number of repetitions essential to insure its efficient recall. The relation is analogous to driving a nail by a single sledge-hammer blow or by a number of light taps. This is why we laid so much stress upon repetition *in attention* as the essential principle of habit-forming. The more strenuous the attention, the more quickly will repetition reach the goal of automatism and *vice versa.*[1]

The relation of attention to primacy is equally clear. Attention abhors monotony as nature abhors a vacuum. It is the new, the changing, the varying that solicit attention; consequently, through the virtue of attention, the new impression becomes the vivid impression. Recency, on the other hand, bears an inverse relation to attention. The recent experience is recalled in spite of the fact that the attention that it aroused was only of slight degree. It is for this reason that recency has the least significance to education; it does not promote the *efficient* recall of experience except by accident.

4. (*b*) *The Recall of Condensed Experiences.* Although the four factors just discussed find their chief

[1] Cf. E. S. Swift: "Acquisition of Skill in Type-writing," in *Psychological Bulletin*, 1904, vol. i, pp. 295 ff.

sphere of activity in the practical judgment, they are not without importance in connection with the conceptual judgment. The condensed experiences which the latter form of judgment involves must be represented by symbols, but these symbols are, intrinsically, concrete sense-materials. The word "horse" is just as much a matter of concrete auditory kinæsthetic or visual kinæsthetic imagery as the image of a particular horse is a matter of visual imagery. The principle "Dry bandages dress this type of burns" is embodied in words which form concrete sense-material just as surely as the servant's revived idea of his master dressing a burn with dry bandages. Therefore the factors that condition the recall of concrete sense-material will serve, under the proper conditions, to effect the recall of condensed experiences.

Repetition is doubtless the factor that operates most frequently in this connection, and repetition is probably more important in the recall of judgments that are borrowed from other sources than in the recall of judgments that one reasons out for one's self.

5. But even under the most favorable conditions, any or all of the four factors above mentioned are inadequate to a maximally efficient recall of condensed experiences. Indeed, the very virtue of condensation lies in the fact that it promotes the operation of a factor of recall that far transcends all others. This factor is *organization*, which is, in essence, the grasping together of judgments by means of their "thought con-

nections." Combinations of sentences that have no relation to one another can, it is true, be fixed in mind by verbal repetition, but the task is dishearteningly tedious and the results inconsequential. But once let the sentences bear a definite relation to one another, once let them be bound together by a thread of unity, and they may be lodged in the memory and become amenable to efficient recall with very little effort.

This is most clearly brought out by the psychological experiments upon memory that have followed in the wake of Ebbinghaus's[1] classic investigations. Ebbinghaus constructed a number of "nonsense" syllables made up of two consonants and a vowel so combined that they would not form a significant word, — for example, *bok*, *jak*, *neb*, *lup*, etc. Among other experiments, he compared the time required for "committing" a series of twelve of these nonsense syllables with the time required for learning a stanza of Byron's "Don Juan." The following table is typical of the results obtained in this test; the Roman numerals indicate the successive days of the tests, the Arabic numerals the number of repetitions necessary to make mastery perfect.

	I	II	III	IV	V	VI
Nonsense syllables . .	16.5	11.0	7.5	5.0	3.0	2 5
Significant stanza . .	7.75	3.75	1.75	0.5	0.0	0 0

Even more convincing testimony is offered by the experiments of Miss Lottie Steffens.[2] She compared two methods

[1] H. Ebbinghaus · *Ueber das Gedachtniss*, 1885.

[2] Lottie Steffens: "Zur Lehre vom okonomischen Lernen," in *Zeitschrift für Psychologie*, etc., 1900, vol. xxii, pp. 321 ff.

of learning one stanza of "Childe Harold's Pilgrimage": (1) the "piecemeal" method, — repeating a single line over and over until it is mastered, then proceeding to the second line, and so on; and (2) the "complete" method, — reading the stanza through as a whole, then repeating the operation until the whole is mastered. She found that the complete method is by far the more economical. This conclusion has been verified by a number of other investigators, among them Lobsien,[1] Pentschew,[2] Des Bancels,[3] and Ephrussi.[4]

The "piecemeal" method, it will be noted, is really a learning of comparatively disconnected sentences, while the "complete" method involves the operation of "thought unities." The same principle explains the differences found by Ebbinghaus in the mastery of nonsense syllables and significant words. Hobhouse[5] utilizes both these experimental sources to demonstrate the efficacy of the factor of organization as contrasted with vividness and repetition in the recall of experiences that function in the conceptual judgment.[6]

6. *Organization in Education.* How the factor of organization operates in education may be clearly seen by comparing the old memoriter methods of teaching geography and history with the modern "rational"

[1] Marx Lobsien: "Memorieren," in *Zeitschrift für pädagogische Psychologie*, etc., 1902, vol. iv, pp. 293–306.

[2] C. Pentschew: "Untersuchungen zur Oekonomie und Technik des Lernens," in *Archiv für die gesamte Psychologie*, 1903, vol. i, pp. 417–526.

[3] J. L. Des Bancels: "Sur les Méthodes de Mémorisation," in *Année Psychologique*, 1902, vol. viii, pp. 185–204.

[4] P. Ephrussi: "Experimentelle Beiträge zur Lehre vom Gedächtnis," in *Zeitschrift für Psychologie*, 1905, vol. iv, pp. 56–103.

[5] Hobhouse, *op. cit.*, pp. 120 ff.

[6] For further practical applications of the "memory" experiments, see O. Lipmann, in *Journal für Psychologie und Neurologie*, 1903, vol. ii, pp. 108 ff.

methods. Instead of memorizing a number of disconnected facts, the present plan is to emphasize the connection between facts, to show how each is related to the others, and how, through all, there runs a certain thread of unity which may frequently be formulated as a general principle or law.

In treating Washington's retreat across New Jersey, for example, the teacher of history will first lead his pupils to see why the retreat was necessary, then why it was made in this particular direction, and so on. It is a fact that Columbus discovered America in 1492. It is also a fact that the Turks captured Constantinople in 1453. There is a distinct causal relation between these two facts, and the tracing of this relation forms a "thought connection" which will serve to fix the two facts in memory far more effectively than an indefinite amount of rote learning. It is well to know that the Missouri Compromise was made in 1820; it is better to know the significance of the Missouri Compromise in the long series of incidents that constituted the antislavery agitation.

Similarly, in geography, it is no longer thought to be sufficient for the child to memorize a number of disconnected facts about a country, — that New York is the largest city in the United States, that Cleveland is an important center of the iron and steel industries, that flour is manufactured in Minneapolis. These isolated facts are grouped under large principles, — principles that serve to give the facts a human significance and to bind them together in connected systems. In other words, the keynote of modern methods in history and geography is to "trace out" causal connections, to discover the underlying principles that unite disparate judgments. Just as the single, particular judgment is a condensation from a number of concrete experiences, so the general principle is a condensation from a number of particular judgments. Experience functions

the more effectively in modifying adjustment the more thoroughly it is condensed and organized into principles. To paraphrase a famous dictum of the philosopher Kant, one may well say that fact without law is blind, and that observation without induction is stupidity gone to seed.

7. But is education to depend entirely upon the factor of organization to insure the efficient recall of experiences? Here one is reminded again of the extremes to which educational theory tends. At one time the work of the school is entirely of the memoriter type. Repetition and rote learning are the order of the day. Another generation sees repetition cast aside and organization exalted. Reasoning becomes the watchword, and anything that smacks of rote learning is rigidly, dogmatically abjured. In the one case, there is a barren formalism that mechanizes the work of instruction and reduces the progress of the pupils to a lock step. In the other case, there is a futile attempt to enforce upon the immature mind forms and processes that are beyond its grasp. The various factors must be harmonized with the needs and capacities of the child, and it will be the task of the next chapter to indicate the principles that govern this adjustment of means to ends.

8. But even where organization becomes the leading factor, vividness and repetition — especially repetition — may play an important, although subordinate, part. Suppose the rule, the principle, or the definition to have been rationally developed, to have been revealed in its proper relation to other items of knowledge, to

have been packed full of meaning and content; it still remains true that this rule or principle or definition has a *form* which verbal repetition may now readily fix and render stable. In other words, the various factors coöperate in making items of experience maximally effective for recall. Jost [1] has proved that primacy and vividness coöperate in this way, and Lipmann [2] has similarly shown that experiences fixed by vividness are given an increased stability by repetition. It is a matter of commonplace knowledge that organization is always aided by repetition, and there can be no doubt that the memorizing of rules and definitions, even after they have been "reasoned out," may still be profitable in the work of education. Repetition alone, or vividness alone, or organization alone is more prodigal of time and energy than a combination of two or even three of these factors.

9. There is one department of education, however, where the sole use of the factor of repetition has an unquestioned right. Each of us has doubtless memorized verse and prose selections during childhood, half the content of the selections being entirely unnoted at the time. As we repeat them afterward, — perhaps years afterward, — we become conscious of meanings that we seem never before to have grasped. When we learned these selections, the mere sensuous pleasure

[1] Jost, in *Zeitschrift für Psychologie*, etc., 1900, vol. xxiv, p. 459.
[2] O. Lipmann, in *Zeitschrift für Psychologie*, 1904, vol. xxxv, p. 221.

that attached to the rhyme and rhythm, to the succession and juxtaposition of sounds, with perhaps a faint glimpse of the hidden meaning, was sufficient to warrant the effort. "Even half-grown boys and girls," says Professor Groos,[1] "take but little note of the sense, compared with the interest that they bestow upon rhyme and rhythm. Is it not a frequent experience of full-grown men and women to be suddenly struck with the profound truth hidden in some epigrammatic form of expression whose euphony has a hundred times delighted them? They have actually failed up to that time to grasp the clear logical meaning of the verse or passage."

The child who does not master some of the great poems and shorter masterpieces of literary prose when he is in the "memory stage" of development will realize in later life that he has missed an important part of his intellectual heritage. He will not understand the full significance of the words as he learns them, but he will store away a veritable mine of intellectual wealth in which, when his higher apperceptive centers have developed, he may delve at his heart's content.

9. *The Concentration and Correlation of Studies as a Means of promoting Organization.* That a thoroughgoing organization of knowledge increases its revival value leads to the inference that studies in the school should be so thoroughly interrelated that each may form

[1] K. Groos: *The Play of Man*, tr. E. L. Baldwin, New York. 1901, p. 21.

a unit in an organic whole. All educators would probably agree that the tasks imposed upon the pupils should be justified by the ultimate aim of education and that, in this sense, subject-matter of instruction should be "concentrated" upon a unitary purpose. But in precisely what degree the facts and principles imparted should be explicitly related to one another in the minds of the pupils themselves has been a matter of some dispute.

The theory of concentration proposed by Ziller[1] and indorsed with slight modifications by most of the Herbartian writers seeks to organize all the subject-matter of instruction into a unified system, the various units of which shall be *consciously* related to one another in the minds of the pupils. To this end Ziller chose, as the central feature or "core" of the curriculum, those subjects which he supposed contribute most to the development of moral character, — namely, history and literature. The remaining subjects were to be taught, not in and for themselves, but simply because they threw light upon, or aided in the interpretation of, the central subjects. Literature finds expression in language; hence the study of language has a vital and, what is more important in Ziller's opinion, an *explicit* relation to literature; or, in our own terminology, literature reveals the need for language study. History, on the other hand, involves

[1] Tuiskon Ziller: *Grundlegung zur Lehre vom erziehenden Unterricht*, 1865.

the study of geography; geography opens the gateway to the natural sciences; while these in turn involve the conceptions of mathematics. Thus the entire elementary curriculum is built up, not as a mere mosaic of disconnected parts, but an organic whole centralized about a unitary "core" in such a manner that the relations of one part to another cannot fail to become apparent to the pupil.

The doctrine of concentration has been very thoroughly worked out and greatly elaborated by Professor Rein,[1] of Jena, and by Professor C. A. McMurry[2] in the United States. The late Francis W. Parker[3] also proposed a thoroughgoing system of organization, somewhat similar to that of the Herbartians, but utilizing science rather than culture-subjects as the "core."

10. Of late the term "correlation" has largely replaced "concentration" to indicate the organization of studies in the school. One may recognize the principle of organization in correlating the various disciplines with one another without attempting, as did Ziller and Parker, to make one subject or set of subjects the central core to which everything else must be subordinated. Subject-matter must be organized, but not in so fine a degree that the values of the various units will be lost to view. There are a great many facts and principles of arithmetic that will not be needed in the study of the natural

[1] Cf. C. De Garmo: *Herbart and the Herbartians*, New York, 1896, ch. vi.

[2] C. A. McMurry: *General Method*, New York, 1903.

[3] F. W. Parker: *Talks on Pedagogics*, New York, 1894.

ences or of geography, but which are still important n life. Similarly, there are many chapters in the formal study of language which have unquestioned value and yet which do not apply to the study of literature. Arithmetic must be taught in a measure as a "closed system," organically complete within its own limits, and the same will be true of geography, history, and the natural sciences. To make the separate parts of a single science coherent and unified will add to the revival value of these parts. To show the relation between certain facts of history and certain facts of geography will contribute to the revival value of each; but to teach history as history and geography as geography certainly does not preclude such a correlation, while to teach geography simply as an adjunct to history would preclude whatever value might accrue from the independent organization of the former. In short, the doctrine of correlation, while it recognizes the wisdom of relating different subjects of instruction to one another, also recognizes the virtue of a coherent organization within the limits of each subject.

Certainly at some time of the pupil's life he should make an effort to grasp the entire body of knowledge in a schematic outline, where the relations between different parts will be thoroughly explicit; but the time when this can be done profitably comes only with reasonable maturity, — perhaps in later adolescence. This large, comprehensive attitude toward knowledge is the

specific province of philosophy. Prior to the prosecution of this study, organization is certainly not to be neglected, but it is to be confined within certain limits which can be determined only by practical experience in the class room. The standard by which these limitations are to be judged, however, is this: Does organization, up to this point, contribute essentially to the efficient recall of the units organized?

CHAPTER XII

THE FUNCTIONING OF THE FACTORS OF RECALL IN EDUCATION AS MODIFIED BY THE PERIODS OF CHILD DEVELOPMENT

1. THE charge of "loose" schoolcraft and a demand for a return to the older and harsher educative methods frequently recur in contemporary educational literature.[1] Under the present régime, it is asserted, drill and discipline have become obsolete terms, effort is at a discount, and the net result is a loss of stamina and a weakening of the moral fiber. But when these charges are made, the "new" education seldom lacks a champion to defend it.[2] The harsher methods, it is maintained, have been justly eliminated. The well-drilled, finely disciplined individual is at best a machine, and modern life requires delicate judgments, adequate to ever differing situations, rather than the machine reaction adapted only to typical situations.

Both parties to this controversy appear to have neglected some very important data that have been accumu-

[1] Cf., for example, Barrett Wendell, in *North American Review*, September, 1904, vol. clxxix, pp. 388–401.

[2] Cf. an editorial in the *Nation*, October 20, 1904, vol. lxxix, pp. 311–312; also F. A. Fitzpatrick: "Reflections of an Iconoclast," in *Educational Review*, 1905, vol. xxix, pp. 151–162.

lated during the past ten years by the now unpopular and much-abused cult of "Child Study," and this neglect is the more unfortunate because the light that child study throws upon the main question at issue renders these heated and speculative discussions quite superfluous. Effort and interest, habit and judgment, repetition and organization, all have a legitimate and indispensable place in the educative process. If certain methods have been emphasized at the expense of others, it is simply because, with his human propensity to hasty generalization, the enthusiastic educator has assumed that a factor which he finds to be efficient at one period of development is equally efficient at all periods of development. As far as the educative process is concerned, however, the child is an entirely different being at different levels of his growth. Each period of development is marked by peculiar physical, mental, and moral characteristics that demand specific treatment. In short, "method" cannot be generalized: what is food and drink at one time may become the veriest poison at a later stage, and what is thoroughly sufficient and adequate at this later stage may work the most disastrous results if applied to the earlier period.

2. Throughout the United States, the eight grades that commonly comprise the elementary school are divided into three fairly distinct groups. Grades I and II form the "primary" division, grades III, IV, V, and VI the "intermediate" division, and grades VII and VIII the "gram-

mar" division. While this grouping was doubtless quite unconscious at the outset, child study has shown that it corresponds very closely to the natural lines of cleavage separating distinct stages of mental and physical growth, and that the threefold division of the elementary school is really based upon fundamental differences in the capacities and needs of children at different ages.

Neither mental nor physical development follows the law of uniformly accelerated motion. On the contrary, both are rhythmical periods of growth, being followed by longer or shorter periods of comparative quiescence, and these in turn by shorter or longer periods of growth. So different are the characteristics of both mind and body at successive crests of these developmental waves that some writers have termed the great changes in the child's life "metamorphoses," indicating an analogy with the changes exhibited in the development of many lower forms of life and most spectacularly, perhaps, in the development of the typical insect through larval and pupal stages to complete maturity. In so far as the work of the school is concerned, this analogy is hardly overdrawn. The school life of the child presents three distinct phases: (1) the *transition* stage, from the age of six to the age of eight; (2) the *formative* stage, from eight to twelve; and (3) the *adolescent* stage, from twelve to eighteen. The stages are closely consistent with the primary, intermediate, and grammar-high school principle of grading. It is true that the dividing lines separat-

ing each stage from its predecessor and successor cannot be accurately drawn, but it is also true that there is, for each individual child, a change much more abrupt than the educator usually recognizes in his practice.[1]

3 (*a*) *The Transition Stage.* The years six to seven and seven to eight form a period of child development somewhat analogous to the later adolescent period, but possessing many individual features not yet well understood. Its *physical* characteristics are (1) relatively rapid growth,[2] (2) an incoordination of the smaller muscles and the finer nerve connections,[3] and (3) a relatively high susceptibility to disease and fatigue.[4] The rapid physical growth indicates that a large part of the potential energy normally available for other purposes is now utilized in the building up of new tissues. The coordination of the nerve connections and the smaller muscles points to a critical period of nervous disintegration. The susceptibility to disease and fatigue confirms this

[1] Cf. W C Ruediger "Has the Dividing Line between Elementary and Secondary Education been drawn at the Proper Point?" in *Elementary School teacher*, 1905, vol v, pp 482–492

[2] This is clearly seen in the tables of growth compiled by various authorities. Cf, for example, Roberts's table as cited by H H Donaldson *Growth of the Brain*, London, 1897, p. 51, and Burk's table, compiled from over sixty-eight thousand cases investigated by Porter, Peckham, and others (F. Burk "Growth of Children in Height and Weight," in *American Journal of Psychology*, 1898, vol ix, pp 253–326).

[3] Hall "Ideal School," in *Addresses and Proceedings, National Educational Association*, 1901, p 478.

[4] Hall. *The Ideal School*, p. 477; *Adolescence*, New York, 1904, vol. i, p. 251.

inference and adds to the significance of this period as one of a comparative paucity of excess energy.

4. The leading *mental* characteristics of the transition stage are suggested by its name. Prior to the age of six, passive attention holds almost undisputed sway. Whatever the child does is done for immediate ends— to satisfy immediate desires. His activity is characterized by an interest in the process rather than in the product. Whatever he is doing absorbs his attention for the time being; the end that is to be gained does not trouble him. The transition period is really a "passing over" of interest from means to end, from process to product, — an initial development from passive to active attention.

But it must be understood that this transition is only initial even under the most fortunate conditions; and the fact that passive attention is still the order of the day is the key to a very important chapter in the pedagogy of this period. Although the child possesses the power of speech, he is not at this time, strictly speaking, a "rational animal." His thinking is still predominantly of the concrete order, and his judgments, in the main, are of the "practical" type. It is still far too early for conceptual thought and logical reasoning, since the condensation of experience has not yet progressed to that point where symbols may effectively rid themselves of their attendant imagery. The word does not function as a

[1] Cf. ch. vi, above.

focal representative of a concept, for the concept itself is still in a nascent stage; consequently, the word is associated definitely with a concrete thing or a concrete image. It is because the condensation of experience to the conceptual point is highly dependent upon active attention [1] that the child in the transition period is so largely unamenable to those educative influences that depend upon "reasoning" and organization.

5. The *moral* characteristics of this stage are likewise to be explained by the incapacity for active attention. If we think of morality as the subordination of momentary impulse to a remote end, we must consider the child at this time of his life as neither moral nor immoral but rather unmoral. Since he is largely incapable of inhibiting unsocial impulses with reference to an ideal, — for he lives in a world of reals, — he must sometimes be forced to this inhibition by the primitive incentives of pleasure and pain — using these terms in a strictly physical sense. Gradually, as the ability to hold in mind the more remote and intangible ideas comes to be developed, these primitive methods may give place to those of higher degree. The child will recognize that the unsocial impulse may profitably be sacrificed in order to gain a reward or avoid a punishment which his widening experience now reveals to him. At a still later period, — probably not until the onset of adolescence, — the abstract ideals of honor, duty, and obedience, functioning

[1] See ch. ix, above.

in conceptual judgments, may come to dominate his conduct.

6. (*b*) *The Formative Stage.* The rapid rate of growth that characterizes the transition period is sharply contrasted with the relatively slow growth of the formative period. A certain amount of energy is consequently set free for other purposes than the formation of new tissues. This is evidenced by the ceaseless activity which is so marked among pre-adolescent children. Indeed, it is probably true that the child expends more energy in proportion to his weight during these years than at any other time of his life. Unlike the adult, however, — with whom he has many points in common, — the channels through which this energy is distributed are not highly organized; hence its constant overflow as "excess." At about the age of eight, the brain practically completes its development[1] as far as weight and size are concerned, and the changes that this organ subsequently undergoes are due to internal organization, — the knitting together of different sense areas, the ripening of the association centers, and the formation of functional connections between neurones. Expressed in another way, this means that the years eight to twelve are the "habit-forming" period, for habit, on its physiological side, is the making permanent of pathways of nervous discharge. President Hall[2] says of this period: "We are now educating the

[1] H. H. Donaldson: *The Growth of the Brain*, London, 1897, p. 104; Hall: *Ideal School*, p. 477.

[2] Hall, *op. cit.*, p. 478.

automatic bases of both mind and morals, and habits are never so easily formed and made stable. . . . It is the time to break in the human colt, in some sense the wildest of all wild animals. If the piano or any other musical instrument is to be learned, this is the time for drill, especially on the scales and exercises. An instrumentalist's technique is rarely good if the foundations are not laid at this stage." The same author also cites the well-known fact that pronunciation of foreign languages is seldom perfect unless the adjustments are made automatic at this time, and Professor James,[1] in his classic chapter on habit, emphasizes the necessity of early training in the little niceties of dress and etiquette, if these acquirements are ever to count for much among one's fellows.

In contrast to the susceptibility to fatigue and disease that marks the transition period, the years eight to twelve show a comparative immunity to both of these energy-exhausting forces. Some authorities,[2] indeed, maintain that the child fatigues easily at this time, but all appear to agree that he recovers very rapidly from fatigue and that a reasonable amount of strain and effort is now quite without the disastrous results which overwork may easily produce in the preceding and in the following period.

[1] W. James: *Principles of Psychology*, New York, 1890, p. 122.

[2] For example, Siegert: *Die Periodicitat in der Entwickelung der Kindernatur*, Leipzig, 1891; cited by King, *op. cit.*, p. 183.

7. The *mental* phenomena that characterize the formative period differ in degree rather than in kind from those of the transition stage. Under the most favorable conditions, the years six to eight can accomplish but a partial transition from passive to active attention. In fact, the "strong stimulus" will never cease to solicit passive attention, and throughout life one is always subject, in greater or less degree, to the temptations of the moment, the passion for change, the desire to do "something else." But in the formative period, while passive attention is still dominant, the concentration and effort that active attention involves can be demanded with less fear of disastrous consequences. At the same time, the child's interests will center very largely in the objective rather than the subjective, and especially in objects that are animate and moving.

According to Kline,[1] the "runaway curve" reaches one of its high points between eight and ten. This means that the dislike for monotony and for "staying with" a task is especially strong at this time. Perhaps it is largely for this reason that the average pupil finds the intermediate grades so irksome. Here, more than anywhere else, the teacher has constantly to battle against nature. On every hand, the stimuli that solicit passive attention must be strenuously, often forcibly, resisted.

The concrete imagery that characterizes the child's

[1] L. W. Kline: "Truancy as related to the Migratory Instinct," in *Pedagogical Seminary*, 1898, vol. v, pp. 381–420.

mental processes in the transition period continues to dominate the early years of the formative period. Judgment is still largely limited to the practical type, experiences being revived with little attempt at condensation. Especially is it to be noted that any tendency toward symbolism is entirely lacking.[1] On the other hand, the capacity for retaining concrete sense impressions is never so strong as during this period; the mind seems to grasp and hold everything that reaches the focus of attention. Even words that are comparatively empty of meaning can be readily impressed; as President Hall[2] says, "Verbal memory is at its very best and should be trained far more than it is." In short, in no other stage of childhood is it so thoroughly true that the mind is "wax to receive and marble to retain."

In the early part of the formative period, the capacity for logical reasoning is still nascent,[3] although it would seem to make its presence felt in a slight degree at about the age of nine.[4] Its subsequent growth is comparatively slow until the onset of adolescence.[5]

[1] E. L. Thorndike: *Notes on Child Study*, New York, 1903, p. 80.

[2] Hall, *op. cit.*, p. 478.

[3] Mary Sheldon Barnes: "The Historic Sense among Children," in *Studies in Education*, 1896, vol. i, p. 90.

[4] "At the age of nine and a half or ten the number of those giving reasons why they wish to follow such and such vocations also rapidly increases." — KING, *op. cit.*, p. 187.

[5] Professor Thorndike, in denying any specific "reasoning" capacity in adolescents over and above that possessed by young children, evidently fails to discriminate between practical and conceptual judgment. *Notes on Child Study*, pp. 98–104.

8. *Morally*, the formative period is best described by its name. Because of the slight capacity for logical reasoning, the more recondite moral judgments are not to be relied upon. The social ideals which play so important a part in such judgments are likewise a product of a later growth, — being, in a measure, acquired interests based upon the sexual instincts that arise with adolescence. From the standpoint of moral culture, the years eight to twelve are preëminently the time for developing *specific* moral habits, — habits of cleanliness, industry, honesty, and obedience, — with very little attempt at "moral suasion," but rather a chief dependence upon arbitrary authority. This statement may smack of barbarism and suggest an unwelcome return to the severe moral culture of the past. But if, in attempting to civilize the child, we assume that he is civilized at the outset; if, in attempting to develop higher motives, we assume that these motives already exist and operate effectively; then we not only commit a logical fallacy, but experience goes to prove that we make a very serious practical blunder. If the child is to be treated by barbaric methods, it is because, from an ethnic standpoint, he has barbaric characteristics.

President Hall's[1] interpretation of the transition and formative periods is particularly illuminating. He believes that the peculiar physical and mental characteristics of the years six to eight are the outcroppings in the individual of traits that

[1] G. S. Hall: *Adolescence*, New York, 1904, Preface, vol. 1, pp. i–x ff.

marked the period of puberty at some remote stage of race history. As infancy has been prolonged, sexual maturity has been retarded, and what was at one time the period of puberty becomes now only a "nodal" point of development, still retaining, however, the adolescent characteristics in miniature. Indeed there is much to confirm this conclusion in the analogies between the transition stage and the much later adolescence — "as if, amid the increasing instabilities of health at the age of about six, we could still detect the ripple marks of an ancient pubic beach now lifted high above the tides of a receding shore-line as human infancy has been prolonged."

In an analogous fashion, Dr. Hall would consider the formative period as representing a remote period of maturity, "when, in a warm climate, the young of our species once shifted for themselves independently of further parental aid." The characteristics of this period were presumably predatory and pre-social, and these we find cropping out in the child from eight to twelve. "The elements of personality are few, but are well organized and on a simple, effective plan. . . . Thus the boy is father of the man in a new sense, in that his qualities are indefinitely older, and existed, well compacted, untold ages before the distinctly human attributes were developed."

Whatever truth there may be in this hypothesis, it still remains as the most illuminating and satisfying explanation of the pre-adolescent child that has yet been offered.

9. (*c*) *The Adolescent Stage.* This important period has been so thoroughly and adequately treated in recent literature[1] that little need be said of its characteristics in this place. *Physically*, it is marked by a very rapid growth, — the rate of growth being sometimes (that is, in individual cases) almost doubled within a single

[1] Especially in President Hall's monumental work.

year, while the normal percentum increase is from one third to one half. The usual accompaniments of rapid growth, noted in connection with the transition period, are again in evidence. There is a diminution of excess energy — sometimes even a positive lack of sufficient energy, resulting in anæmia, lassitude, and *Weltschmerz.* There is a recurrence of the nervous disintegration characteristic of the former period, and this finds an expression in awkward movements, uncertain adjustments, and a general incoordination sometimes bordering upon chorea. While the mortality average is much lower than during the preceding years, owing to a diminished susceptibility to the diseases peculiar to childhood, there is, on the other hand, an increased susceptibility to adult diseases; it would also appear that the germs of many diseases that raise the mortality average later in life are apt to be implanted at this time.[1] But the most important physical changes are, of course, involved in the development of the primary and secondary sex functions. These ultimately furnish the key to the explanation of the mental and moral characteristics.

10. *Mentally*, then, as well as physically, adolescence is a "new birth." The intellectual changes — in themselves profound — are at first quite overshadowed by the emotional instability. "Fear, anger, love, pity, jealousy, emulation, ambition, and sympathy are either now born or springing into their most intense life."[2]

[1] Hall: *Adolescence*, ch. iv. [2] Hall: *Ideal School*, p. 483.

All these are what might be termed "social" instincts. They imply an innate widening out of the child's horizon. Heretofore he has been largely self-centered, in the narrowest sense of this narrow term. The new instincts have no less a selfish reference, but they also include a "consciousness of kind" that has hitherto been lacking.

This sudden coming into function of a host of new instincts accentuates the dominance of impulse and thus in a measure causes a reversion to passive attention. Hall[1] places the apex of the runaway curve at the beginning of this period. All teachers of adolescent children would doubtless agree that the child entering upon this stage reacts very strongly against the drill and repetition to which he has become inured during the preceding period, and it is certainly true that the factor of interest will bring far better results at this time than the factor of forced effort.

The interests that can be appealed to, however, are on a much higher plane than the primitive interests of early childhood. The dominant instincts are innate, it is true, but they operate upon a superstructure built up during the preceding period. Indeed, the drill and discipline of the formative years may be looked upon as a necessary preparation, — as a culture of the soil in which the social instincts are to be planted; and the pedagogy of adolescence will be easy or difficult accord-

[1] Hall: *Ideal School*, p. 484; *Adolescence*, vol. i, p. 348.

ing as the work of the preceding period has been done well or ill. Adolescence brings with it a new outlook from a higher vantage point, but the acquisitions already made must form the field which this new outlook faces. Hence the dominant interests are, in a sense, acquired interests They are relatively permanent and abiding, relatively deep and penetrating. The idle curiosity of childhood becomes a deeply seated love of knowing for the sake of knowing; the blind and purposeless imitation of infancy becomes critical of ends, and from the mere copyist is developed the virtuoso; emulation is more highly organized, sees farther into the future, and forms the basis of ambition; the primitive "puzzle" instinct, which culminates in the formative period,[1] now merges into a deeper interest that seeks to discover causes and to trace out hidden relations; and the instinct of property which, as early as four or five, found a primitive expression in aimless and trivial collections[2] now takes a rational and human form. All or almost all the instincts that dominate early childhood are intensified during adolescence, but, owing to the culture of the preceding years and to the modifying influence of the new "consciousness of kind," they seek a far different expression.

All these factors operate to heighten the capacity

[1] E. H. Lindley: "A Study of Puzzles," *Pedagogical Seminary*, vol. vii, pp. 431–443.

[2] C. F. Burk: "The Collecting Instinct," *Pedagogical Seminary*, vol. vii, p. 179.

for logical reasoning. The new interest in causes and hidden relations places a premium upon the conceptual rather than the practical judgment. The broader outlook renders condensation and some form of symbolism an absolute necessity. There is a transition almost from one extreme to the other; where before the mental processes were intrinsically concrete in their meaning, where the detailed and particular were wholly dominant, there is now a tendency, sometimes almost a yearning, toward the most profound abstractions. The broad conceptions of science, the comprehensive movements of history, the critical interpretations of literature, are now thoroughly in place. "Neither you nor I, however specialized our knowledge, know anything really worth knowing the substance of which cannot be taught now if we have pedagogical tact." [1]

11. This truth is even more forcibly impressed when we turn to the *moral* characteristics of adolescence. The profound emotional changes combine with this broadening of the intellectual horizon to make this period the great breeding-ground of ideals, and it is the inevitable clash and conflict of these ideals that justify the term "storm and stress period," so frequently applied to later adolescence. The profound religious awakening on the one hand and the stronger tendencies toward criminality on the other mark the extremes in the post-pubertal development of the sentiments. Con-

[1] Hall: *Ideal School,* p. 485.

duct is organized on a much more elaborate plan. Motive, which has hitherto been determined by the primitive standards of immediate pleasure and pain, now takes its cue from desires that look to realization far in the future.

From these facts, it follows that the methods of moral culture must be transformed almost in a day. Just as in mental training "the drill and mechanism of the previous period must be relaxed," so, in moral training, the arbitrary and authoritative rulings that have hitherto been the mainstay must now give place to reason. All forms of punishment that appeal to the fear of physical pain are beyond doubt always more productive of evil than of good in the normal adolescent, no matter how serious his offense. If he cannot see in what manner the inhibitions and repressions that are demanded of him will conduce to his ultimate well-being, it will be next to impossible to compel these restrictions through physical force and at the same time fail to work an irremediable injury. He feels that he has left such methods behind him in the stage from which he has just emerged, and it is pedagogical wisdom to respect this conviction, even at some sacrifice.

12. *Summary.* The foregoing analysis must, of course, be subject to whatever revisions future investigations in the field of child study may dictate; but in the light that is now available it would seem to indicate in no uncertain terms that the child at different levels of his

growth has different needs and capacities that must be catered to in different ways. It consequently follows that the factors conditioning the recall of experience cannot be intelligently applied to the educative process without taking into account these varying characteristics. The following conclusions attempt to formulate such an interpretation; if they seem to assume a too rigid demarcation between periods, it is because the writer is convinced that this type of possible error is a far safer risk in the present connection than its opposite would be.

(1) The factor that operates most effectively in the *transition* period is vivid portrayal dealing almost exclusively with concrete experiences. Repetition is frequently in order, provided that it involves a minimum of strain and fatigue. Logical reasoning is thoroughly out of place, and symbols must not be used apart from a direct connection with the concrete experiences for which they stand. Moral culture is of a strictly pleasure-pain type with pleasure predominating.

(2) In the *formative* period, repetition is the watchword, but it should be strongly supplemented by vivid portrayal and, in the later stages, by the simpler operations of logical reasoning. Symbols should still be closely associated with the concrete, but there is some place for the operation of verbal memory through repetition, even if the underlying conceptions have not been thoroughly traced out. The more specific moral habits

should be thoroughly automatized; their advantage to the child's immediate well-being should be clearly shown if possible; in case this is out of the question, moral rules should be arbitrarily enforced until adjustments that harmonize with them have become matters of habit.

(3) Organization or logical reasoning holds undisputed sway in the *adolescent* stage. There is, however, abundant opportunity for vivid portrayal provided that it cooperates with organization; and some slight place for repetition provided that the need for it originates in the child himself, and provided that it operates upon processes already organized. Moral culture is now entirely of the rational type, and future rather than immediate well-being can be safely appealed to. Exalted ideals can and must be developed, with which immoral action will be clearly seen to be inconsistent; and moral instruction, before largely impersonal, must now be strongly tinged with inspiration.

PART V. THE SELECTION OF EXPERIENCES FOR EDUCATIONAL PURPOSES: EDUCATIONAL VALUES

CHAPTER XIII

FORMAL *versus* INTRINSIC VALUES OF EXPERIENCE: THE DOCTRINE OF FORMAL DISCIPLINE

1. UNTIL very recently, the experiences that the school attempted to impart were divided into two classes: (1) those which were or might be intrinsically valuable to the individual in facing future situations, and (2) those which were not intrinsically valuable but which were believed to develop certain general tendencies to reaction that would insure a definite response to situations of different types. In a sense, this was a very broad extension of the differences, already noted, between habit and judgment. Certain subjects of the curriculum, if properly pursued, were believed to develop what might be termed "generalized" habits. A simple habit is a specific response to a specific stimulus; a generalized habit would be a specific response common to a number of different stimuli.

For example, a pupil may acquire the specific habit of producing neat papers in arithmetic. The doctrine of formal

discipline assumes that if this habit is once thoroughly established, it will function equally well in connection with language and drawing; that, functioning successfully here, it cannot fail to insure neatness of person and attire, and that the habit of neatness thus ingrained upon the pupil will surely be carried over into mature years.

Again, it has been assumed that the study of mathematics trains general habits of reasoning, that nature study trains general habits of observation, and that all branches, properly pursued, train general habits of industry. Analogously, it was assumed that the capacity for memory was capable of improvement through formal discipline, and the study of the ancient languages has frequently been justified on this ground.

The extent to which this doctrine has been applied is plainly apparent from the most cursory study of the traditional curricula of the higher schools. While many of the facts and principles embodied in these curricula can probably be otherwise justified, it still remains true that they have held their place almost solely upon this supposition; and even in the elementary school, the instruction in grammar and to some extent the instruction in arithmetic have been governed by the supposed operation of this factor.

2. It is clear that, so far as a "generalized habit" is concerned, the term is a psychological absurdity. The very essence of a habit is the specific character of its response. An habitual adjustment is a definite reaction called forth by some specific stimulus or combination of stimuli, and if habit were capable of being generalized, the utility of judgment or conscious adjust-

ment would be greatly diminished. But while this theoretical evidence is unquestionably sound, it has not operated to prove the theory of formal discipline to be a practical fallacy; largely, perhaps, because actual experience seems to demonstrate that, notwithstanding the theoretical absurdity of the statement, habits *are* generalized. Cases are cited in the literature, and can easily be multiplied from individual experience, which indicate that a thorough training in the mathematical disciplines has given one an increased capacity for efficient reasoning in other lines, and that insistence upon neat work has had a beneficial effect upon the neatness of person and dress. In fact, so conclusive is this empirical evidence that the theoretical impossibility carries but little weight.

3. This condition amounts almost to a paradox, and indicates the need of careful experiments based upon accurate methods. Such experiments have been conducted at Columbia University within the past few years with very suggestive results. The general problem was the influence that special forms of training may have upon related functions.

"Individuals practiced estimating the areas of rectangles from 10 to 100 sq. cm. in size until a very marked improvement was attained. The improvement in accuracy for areas of the same size but of different shapes, due to this training, was only 44 per cent as great as that for areas of the same shape and size. For areas of the same shape but from 140–300 sq. cm. in size the improvement was 30 per cent as great. For

areas of different shape and from 140–400 sq. cm. in size the improvement was 52 per cent as great.

"Training in estimating weights of from 40–100 g. resulted in only 39 per cent as much improvement in estimating weights from 120 to 1800 g. Training in estimating lines from 5 to 1.5 in long (resulting in a reduction of error to 25 per cent of the initial amount) resulted in no improvement in the estimation of lines 6–12 in. long.

"Training in perceiving words containing *e* and *s* gave a certain amount of improvement in speed and accuracy in that special ability. In the ability to perceive words containing *i* and *t*, *s* and *p*, *c* and *a*, *e* and *r*, *a* and *n*, *l* and *o*, misspelled words and *A's*, there was an improvement in speed of only 39 per cent as much as in the ability specially trained, and in accuracy of only 25 per cent as much. Training in perceiving English verbs gave a reduction in time of nearly 21 per cent and in omissions of 70 per cent The ability to perceive other parts of speech showed a reduction in time of 3 per cent, but an *increase* on omissions of over 100 per cent."[1]

Professors E. L. Thorndike and R. S. Woodworth, who conducted these experiments, reached the following conclusions.[2] —

"Improvement, in any single mental function, need not improve the ability in functions commonly called by the same name. It may injure it.

"Improvement in any single mental function rarely brings about equal improvement in any other function,

[1] E. L. Thorndike *Educational Psychology*, New York, 1903, p 90, for details, see Thorndike and Woodworth "The Influence of Improvement in One Mental Function upon the Efficiency of Other Functions," in *Psychological Review*, 1901, vol. VIII, pp. 247–261, 384–395.

[2] Thorndike, *op. cit.*, p. 91.

no matter how similar, for the working of every mental function group is conditioned by the nature of the data in each particular case.

"The very slight amount of variation in the nature of the data necessary to affect the efficiency of a function group makes it fair to infer that no change in the data, however slight, is without effect on the function. The loss in the efficiency of a function trained with certain data, as we pass to data more and more unlike the first, makes it fair to infer that there is always a point where loss is complete, a point beyond which the influence of the training has not extended. The rapidity of this loss — that is, its amount in the case of data very similar to the data on which the function was trained — makes it fair to infer that this point is nearer than has been supposed.

"The general consideration of the cases of retention, or of loss of practice effect, seems to make it unlikely that spread of practice occurs only where identical elements are concerned in the influencing and influenced function."

Dr. Naomi Norsworthy[1] carried on similar experiments with school children, using similar methods and reaching the following conclusions: —

"It seems probable that certain functions which are of importance in school work, such as quickness in arith-

[1] N. Norsworthy: "Formal Training," in *New York Teachers' Monographs*, 1902, vol. iv, pp. 96–99.

metic, accuracy in spelling, attention to forms, etc., are highly specialized and not secondary results of some general function. That just as there is no such thing as general memory, so there is no such thing as general quickness or accuracy or observation. . . . Accuracy in spelling is independent of accuracy in multiplication, and quickness in arithmetic is not found with quickness in marking misspelled words; ability to pick out the word 'boy' on a printed page is no guarantee that the child will be able to pick out a geometrical form with as great ease and accuracy."

At the Montana State Normal College careful experiments [1] were undertaken to determine whether the habit of producing neat papers in arithmetic will function with reference to neat written work in other studies; the tests were confined to the intermediate grades. The results are almost startling in their failure to show the slightest improvement in language and spelling papers, although the improvement in the arithmetic papers was noticeable from the very first.

4. The very decided trend of all this experimental evidence seems to indicate that the theoretical impossibility of a generalized habit — either "marginal" or subconscious — is thoroughly substantiated by accurate tests. There still remains, however, the widespread

[1] These experiments were planned by Dr. Carrie R. Squire and conducted by Margaret Ross, Lilian Lambrecht, and Frances Chase, students in the college.

notion that formal training *is* generalized, and whatever cases may be adduced stand against the evidence from experiment. Professor Thorndike[1] disposes of such cases in three ways: (1) where specific training is thought to spread out and affect other functions, it may simply mean that the individual in whom this tendency seems to be evinced is really inherently more capable than the average; therefore, if he shows particular aptitudes for the study of Latin, he may later excel in Greek, not because the pursuit of Latin has necessarily improved the functions that operate in the study of Greek, but because the individual is "bound" to excel in anything. (2) Certain effects commonly attributed to discipline are really due to "mere inner growth and maturity." (3) Educators tend to judge all children on the basis of their own childhood, — a fallacious procedure, because educators "are likely to be gifted men who could as boys and girls readily acquire and apply general ideas and habits."

Professor O'Shea,[2] whose discussion of this matter is especially clarifying, would ascribe the seeming "spread" of special training to the fact that many lines of activity, differing in several characteristics, may yet have some characteristics in common. If such is the case, training in one may promote efficiency in the others. "The geometrical method is incorporated, as it were, in the

[1] Thorndike, *op. cit.*, p. 93.

[2] M. V. O'Shea: *Education as Adjustment*, pp. 271 ff.

more involved method of physics, and it would seem most economical to have the student familiar with the method of geometry before he undertakes the study of physics. So, too, the method gained in the observation of plant life will be of assistance in observing human life."

All these explanations, however, seem to leave something unaccounted for. What this something is, from the writer's standpoint, may appear in the following cases.

The writer believes that he has acquired a passable habit of industry in connection with his school work. He is fairly regular in his hours of rising and retiring; he goes to his class room and laboratory at stated periods, and accomplishes a fairly uniform allotment of work each day. This routine goes on day after day throughout the school year. Of course the daily tasks present some degree of individuality: new situations will arise which must be met and mastered. But, in general, the day's work is reduced to the plane of habit. The "work attitude" is assumed at a definite time and dropped at a definite time. It forms, as it were, a large ring of habit, within which are smaller rings, and within these and across them are the dots and chains of focalized effort.

But outside these rings of habit, within which the day's work is accomplished, persistent effort is distasteful and unsatisfactory. If the writer attempts to "carry over" his habit of industry from the class room to the wood pile, nature rebels. His tendency at such times, he frankly confesses, is to "loaf" and temporize. The summer months are spent upon a farm. Here it is to his advantage — hygienic and otherwise — to take a serious part in the farm work; yet his first tendency is antagonistic to industry. He does not crave inaction, but he

dislikes the persistent effort that one identifies with work as distinguished from the temporary and ever changing activity which, however strenuous it may be while it lasts, is still closely akin to play. The first day may go off very well, for it is a change and presents a certain element of novelty; but for several days afterward industry is a constant battle against nature. In the course of time, however, the farm work becomes as much a matter of course as the school work has previously been. That is, *a new habit of industry has been acquired through a period — longer or shorter — of strenuous, conscious effort.*

It seems perfectly clear that, in this case at least, the habit of industry — the ability to sustain a line of continuous effort with a minimum of conscious "prodding" to a fairly remote end — is not carried over from school life to farm life. And yet something is carried over. The formation of the new habit of work is undoubtedly more economical of time and energy than it would be had not a habit of work already been developed in another field.

Again, the writer is convinced that students who come into his classes in psychology after completing thorough courses in the higher mathematics do far better work than those who have not had this "training." Something has been carried over from one study to the other. It is certainly not the *habit* of study, nor are the points that mathematics and psychology have in common sufficient to account for this difference.

The paradox reaches its climax in the case of habits of neatness. Here the experiments indubitably validate the general law that habit is specific. General experience seems to confirm this experimental verdict on one

hand and to deny it on another. The writer has a friend who is scrupulously neat in his personal attire and yet whose desk and study are samples of conspicuous confusion. He has another friend who is neat almost to the point of femininity in the details of his work and yet careless to the point of slovenliness in his attire. So far the specific character of cleanly adjustments seems to be confirmed. But he can, at the same time, count a dozen among his acquaintances who are neat in all departments of life and a few, at least, who are slovenly in everything that they are concerned with. Here it seems at first sight that the habit is generalized.

And yet it is these last exceptions that really prove the rule. If it were the tendency of habit to become generalized, neat adjustments in one activity would mean neat adjustments in all activities *in all individuals.* That it does hold with some individuals, but not with all, is sufficient to prove that the *habit*, as such, is not generalized. But that there is some link that joins all specific habits of neatness is perfectly apparent to any one who may have a particularly "tidy" acquaintance.

5. What, then, is the connecting link between habits of different species and the same genus? The distinction already noted between habit and judgment suggests that, just as the latter may initiate the former, so judgment may connect and establish a functional relation between two specific habits. In other words, what I carry over from my school work to my farm work is

not a generalized *habit* of work, but a generalized *ideal* of work. It is something that functions in the focus of consciousness and hence cannot be identified with habit, which always functions either marginally or subconsciously. This ideal furnishes a motive and this motive holds me to conscious, persistent effort until the new habit has become effective, until the distracting influences no longer solicit passive attention. *If I had acquired a specific habit of work in one field without at the same time acquiring a general ideal of work, my acquisition of a specific habit in another field would probably not be materially benefited.*

Similarly with the habits of mental application or study. The students who come to psychology from the mathematical courses have no generalized habit of study, but they have an ideal of study. They have penetrated pretty deeply into abstract problems and, along with their drudgery, they have experienced some delight of achievement, some of the pleasure that attaches to successful effort. It may be that mathematics has given them nothing but this, but this is enough to hold them to their new task until a new and specific habit of psychological study has been established.

Similarly, too, with the habit of neatness. Those who appear to carry this habit over from one department of life to another really carry over the ideal of neatness. This explains why some persons are neat in their work and untidy in their dress, while others are neat in their

dress and untidy in their work, and still others are neat in both work and dress. *An ideal is an individual factor.* One may be neat in one's work from other motives than a general ideal of neatness. Neat work may be an essential to success; neat work may mean economy of effort; neat work may mean a thousand other things that have no relation whatsoever to neatness of dress and person.

The word "discipline" implies a mechanizing process — the formation of an habitual reaction that shall function with little or no effort of attention after it has once been firmly established. But, in its initial stages, the process of habit building must always be conscious — focal. There must necessarily be effort, — struggle to hold one's self to the line, — struggle to resist the normal desire for change. Gradually this struggle becomes less and less strenuous until finally the process is completely mechanized. This mechanizing, however, must be thoroughly specific in the narrowest sense of this term; and if the line of work is changed ever so slightly, a new habit must be formed. This means a refocalization, a new period of conscious effort, and it is at this point that what we have termed the ideal has its sphere of activity.

6. The factor of ideals may operate with equal efficiency in connecting specific functions other than habits. The Columbia experiments seem to indicate that "reasoning" processes are as thoroughly individual as are

habits, and it is seriously to be doubted whether the discipline of geometry or any other form of the higher mathematics will enable the student to "reason" any better in biology or political economy. Indeed, the very fact that specialists in mathematics are not infrequently handicapped in making effective judgments in other fields would speak strongly against a general capacity for reasoning.[1] Nevertheless, a training in mathematics may well give a student ideals of exact methods of procedure in getting at truth, and these ideals can be generalized to any extent that one desires. It is needless to say, however, that mathematics can be taught without impressing such ideals, and it is equally easy to see that a high degree of mathematical proficiency does not necessarily mean that such ideals function.

The pursuit of natural science may similarly develop ideals of observation. This does not mean that the student who has pursued natural science will thereby have gained a tendency to make acute observations in fields other than those in which he is proficient; he will be no more likely to note a two-bit piece lying between the cracks of the sidewalk than his unscientific brother; and it is certainly to be hoped that he will not have acquired an abnormal disposition to see the mote that may lie in this brother's eye. But if he passes from the study of biology to the study of psychology, he may easily make some such judgment as this: "Careful observation is

[1] Cf. O'Shea, *op. cit.*, p. 266.

the basal principle of truth getting in biology; it may work equally well in psychology; therefore I shall acquire a new habit of psychological observation."

7. The important lesson for education in connection with ideals is apparent from these examples. The doctrine of formal discipline assumed that the mastery of a certain subject gave one an increased power to master other subjects. It is clear that there is a certain amount of truth in this statement, provided that we understand very clearly that this increased power must always take the form of an ideal that will function as judgment and not of an unconscious predisposition that will function as habit. In other words, *unless the ideal has been developed consciously, there can be no certainty that the power will be increased, no matter how intrinsically well the subject may have been mastered.*

The factor of ideals does not appear in the experiments noted above simply because the experiments demanded its elimination. The problem under investigation was whether a habit can be carried over as habit, not refocalized and made to function as idea or ideal. In the tests of neatness, for example, it was distinctly understood that the pupils should have no general instruction on neatness as an ideal. Neatness was exacted of them in arithmetic, and the matter ended there.

The passing of the doctrine of formal discipline certainly does not detract in the least from the serious responsibility of the school to develop specific habits of

cleanliness, industry, and mental application in the particular and specific line of work with which it is concerned; for, if the carrying over of a good habit from one occupation to another demands a process of judgment dependent upon an ideal, surely this ideal can be strengthened and sustained only by a cultivation of the specific habits that form its concrete expression. It would be futile to instill ideals of cleanliness, industry, and honor in the schools, expecting them to be applied in later life, if, at the same time, the antitheses of these ideals — filth and sloth and vice — were tolerated in the daily experience of the pupils.

CHAPTER XIV

The Development of Ideals the Chief Work of Education

1. If the conclusions of the last chapter are valid, it follows that there is an educative value of experiences over and above their intrinsic worth as facts or items of knowledge. The experiences that the individual acquires may carry with them ideals that may later serve to modify adjustment even more fundamentally and efficiently than the knowledge itself. Our definition of education must be extended to include ideals as an important type of condensed experiences not always recognized in the educative process.

2. This conception is especially important in the light of existing tendencies. The passing of the dogma of formal discipline has greatly enhanced intrinsic values. Where hitherto subject-matter has often been justified only by its supposed disciplinary effect, such subject-matter is now either justified on other grounds or eliminated altogether. This has been a healthful reaction, for the pendulum undoubtedly had swung too far to the other extreme. But, as the last chapter indicated, the basal notion of disciplinary values had too large a measure of worth to be cast entirely aside. Indeed, it is

hardly too much to say that, if one must choose between the two, the doctrine of formal discipline, with all its fallacies, would be a far safer risk than the doctrine of exclusively intrinsic values. The mere subject-matter of knowledge might be likened to the letter that killeth; the ideal, to the spirit that maketh alive.

It would probably be difficult to overestimate the importance of ideals in civilized life. They are the dominant forces in all the great movements of history. Races and nations are distinguished from one another by their ideals far more than by their inherent physical and mental peculiarities. In spite of the elements that foreign nations have contributed and are contributing to the American people, our nation is distinctly individual because it has its individual ideals. The German, the Celtic, the Slavic, and the Romance ingredients become indistinguishable after two generations because their distinctive race or national ideals have been dropped and the American ideal has been assimilated. That the Jewish people still maintain their racial characteristics is due to the fact that their great ethnic ideals are cherished from generation to generation with a tenacity that no other people of history have even approximated.

Nor is the operation of ideals less evident in individual development. The impetus which family pride may give to individual effort is illustrated in such strains as the Adamses of Massachusetts, the Breckenridges of Kentucky, the Harrisons of Indiana, and others too

numerous to mention. The very fact that one's forbears have accomplished things and attained to high places among their fellows may form a most effective spur to the present generation. Certainly not all great men's sons are great, but this fact only lends confirmation to our hypothesis, for the ideal may or may not be developed; while, if the tendency to preëminence were transmitted physically there should be no such exceptions as we now find.

The *esprit de corps* that is expressed in loyalty to one's school or college is another type of ideal that functions effectively in spurring one on to greater effort. The college or the university that can imbue its students with such loyalty is doing much more to equip them for the battle of life than the institution that simply instructs, no matter how faithfully that instruction may be imparted. It is largely for this reason that the personal influence of teacher and professor counts for far more in the long run than the mere mechanical advantages of libraries and laboratories and work shops.

3. It is safe to assert, then, that the main aim in education is to instill ideals that will function as judgments, and that, in one sense at least, the subject-matter of instruction must be totally subservient to this aim. The classical education of the past undoubtedly had little worth in so far as the intrinsic value of its subject-matter was concerned; but it had immeasurable worth in so far as the ideals that it instilled were concerned. If

the new education fails to develop equally effective ideals, its mission will result in a net loss, no matter how thoroughly it may succeed from its own intrinsic standpoint. Mark Hopkins on one end of a log and ambitious youth on the other end are no less the type of a true college to-day than in the boyhood of Garfield.

4. But can the formal and the intrinsic values be satisfactorily adjusted? Is it possible to place the main emphasis upon ideals and yet so impress the more specific judgments that they will function effectively?

The results in typical cases seem to justify an affirmative answer to these questions. Intrinsically useful materials may just as successfully form the basis for the development of ideals as intrinsically useless materials. That the student of engineering or agriculture or commerce does not always acquire the ideals that mark the cultured and refined "gentleman" is not the fault of the subject-matter, but rather of the method. The old classical curriculum did not always produce the desired result; in both cases the subject-matter is always subservient to the spirit in which it is imparted. Chemistry and physics and commercial geography *can* be taught in a mechanical fashion, but so can Greek and Latin and history. In both cases, the result, in so far as ideals go, is precisely the same, but the former is the less serious of the two evils, for at any rate useful knowledge has been acquired, while in the latter case the entire process is a dead loss. It may be that the ten-

dency toward mechanical method is stronger in the former case. Everything that is in the line of progress carries with it some new and often unforeseen danger; and just because scientific and technical instruction is intrinsically useful, the instructor is probably more likely to miss the broader outlook, which, in turn, is more easily retained when the value of the subject-matter is purely ideal.

It may be concluded, then, that the function of the teacher is to inspire as well as to instruct. Doubtless his task would be materially simplified if one or the other of these factors could be eliminated, but the time when this could be safely done is past. New conditions impose new duties and demand a readjustment. In this readjustment something will assuredly be lost. The task must be so to balance the factors that a *net* gain will result.

5. It is difficult adequately to define in psychological terms just what we mean by the word "ideal," yet it is essential that the notion be made as definite and tangible as possible if the dangers of loose thinking, to which educational science is so prone, are to be avoided. The following analysis, although quite inadequate from the psychological standpoint, may serve this purpose in some measure.

(1) An ideal is a type of condensed experience. It is the upshot of a multitude of reactions and adjustments, both individual and racial.

(2) Because it represents condensed experience, it is commonly formulated as a proposition or conceptual judgment. For example: "All men are created free and equal;" "The greatest good of the greatest number is the standard of conduct;" etc. Or it may be attached to a single word such as "honor," "chastity," "truth," "patriotism," and the like.

(3) As a condensed experience, it functions in the process of judgment. It serves as a conscious guide to conduct, especially in novel and critical situations. It functions in the initiation of specific habits, and such habits once formed may be said to harmonize with the ideal; but ideals themselves do not function as habit, although the judgments that are based upon them may often be of the "intuitive" type.

(4) The development of an ideal is both an emotional and an intellectual process, but *the emotional element is by far the more important.* Ideals that lack the emotional coloring are simply intellectual propositions and have little directive force upon conduct.

(5) Ideals may be classed as high or low according as they are (*a*) concrete or abstract; (*b*) selfish or social; (*c*) formed with reference to immediate or remote ends.

6. The above characteristics suggest some fundamental propositions regarding the pedagogy of ideals.

(*a*) It has already been indicated that the period of adolescence represents the best time for the development of ideals. This means that the work of the grammar

grades, the high school, the college, and the university must be organized with especial reference to this factor. It also means that the personality of the teacher or instructor during this period is of fundamental importance.

(*b*) That the emotional element is dominant in the development of ideals indicates that mere didactic instruction from the intellectual standpoint is not sufficient. The emotional spirit of the instruction is the factor that counts. It is also necessary that the ideal be reënforced and confirmed through as many channels of emotional functioning as possible, — that is, through the forms of æsthetic, intellectual, and religious sentiment.[1] Art, literature (including poetry, the drama, and fiction), music, and religion are the great media for the transmission of ideals and as such fulfill an educative function far more fundamental than our didactic pedagogy has ever realized.[2]

[1] Cf. E. B. Titchener: *Primer of Psychology*, ch. xii.
[2] Cf. ch. xviii below.

CHAPTER XV

The Intrinsic Values of Different Types of Experience

1. If education is to produce the socially efficient individual, it is essential that the educator know in what degree different types of experience will promote this end, and particularly the relative values of different facts and principles — different items of knowledge — in their intrinsic relation to this end. These values fall into the five classes: (*a*) utilitarian, (*b*) conventional, (*c*) preparatory, (*d*) theoretical, and (*e*) sentimental.

2. (*a*) *Utilitarian Values.* The utilitarian value of knowledge implies that its direct application may serve in the solution of the problems and situations that life presents. Detailed facts and general principles may alike lend themselves to this purpose. If I know that eighteen inches of rainfall are necessary to agriculture without irrigation, I shall certainly not settle in a country where the annual rainfall is below this point, with the expectation of making a living by "dry" farming. If I know that, to find the interest on $600 for 6 months at 6 per cent I multiply $6 by 3, my debtor will not be able to cheat me. If, as a sailor, I know that a sudden

fall in the barometer commonly presages a severe storm, I can take in sail in time, perhaps, to avert a disaster.

Facts and principles, then, have utilitarian value when they can be applied directly to some of the needs and situations of life. They have a legitimate claim on instruction *from this standpoint* when it can be shown that their utility will probably be called into service by the majority of the pupils receiving the instruction. Thus the laws of percentage and interest, the rules for addition and subtraction, the principles of commerce, may be said to be of probable value to every individual. Opportunities will doubtless present themselves in his future adjustments when such knowledge will render these adjustments efficient. On the other hand, there are many facts and principles that have no possible utilitarian value, and a still larger number the utilitarian value of which will in any case be limited to certain classes of the population. The number of persons, for example, who find occasion in mature life to apply the rules for extracting square and cube root is extremely small, and the same statement could be made with reference to a thousand other facts and principles that are imparted in elementary instruction. In fact, if those items of knowledge that have no utilitarian value were excluded from the school curriculum, a very few years would be sufficient to cover the work.

It is true, however, that a utilitarian value may not be obvious upon the surface. This is not the case with the study of

arithmetic, for the utility of quick and accurate methods of computation can never be doubted. But this is not so obvious in the case of geography. And yet if we think of geography as a study of the environment in its relation to the life of the individual, the very definition seems to imply utility. Broadly speaking, all life is adjustment to an environment. Anything that tends to render this adjustment more efficient is of value from the standpoint of utility. Whatever reduces waste, whatever saves time, energy, labor, whatever increases wealth and material prosperity, may be looked upon as utilitarian in its value. That the facts of geography possess such value is probably not obvious at first glance, but a few concrete instances may serve to demonstrate it.

The process of distribution that is continually going on, tending to relieve the congested areas of the earth's surface and to populate the undeveloped areas, may take place either blindly or intelligently. In the former case, lack of accurate information concerning the conditions of different regions — their relative productivity, healthfulness, etc. — leads to a chance or fortuitous selection of favorable environments. That is, under conditions of geographical ignorance, migratory movements frequently entail a tremendous material waste, — to say nothing of human suffering. We have already referred to the misfortunes that followed the wild rush into the semi-arid regions of western Kansas and Nebraska in the early eighties. This migratory movement was a mistake due to ignorance of geographical conditions. To-day the work of the scientific bureaus of the national government is devoted to the gathering of accurate information regarding the temperature, rainfall, fertility, and salubrity of various parts of the country. Annually a vast mass of information is published, — information which is, in its very essence, geographical knowledge. The pupils in the upper grades of the elementary schools should certainly be made acquainted with the sources of this information and trained in its interpretation.

The merchant engaged in the export trade has no longer to send his vessels to distant shores on the chance that a market may be found for his goods. The "Consular Reports" published by the government give accurate information concerning the commercial geography of foreign countries, — what goods are in demand, at what profit they may be sold, what duty must be paid for their importation, what commodities do not find a sale, and a host of other valuable facts, knowledge of which will operate to reduce losses and increase profits. All this geographical knowledge is important from the utilitarian point of view to many different classes of people. It is knowledge which the merchant, the farmer, the manufacturer, and the legislator may frequently use to their advantage. And the laborer, seeking a market for his labor, may be just as materially benefited by such knowledge as the manufacturer seeking a market for his products.

The writer once proposed this question to an eighth-grade class that had been exceptionally well prepared in commercial geography: "The Great Northern Railroad recently sent a representative to Asiatic Russia to study the trans-Siberian Railroad, which was then just completed: what motives led the management to take this step?" A variety of answers were obtained, nearly all showing commendable acumen of thought. They were criticised by the class with the aid of suggestive questions, and the conclusion was finally reached that the Great Northern directors were anxious to know whether they could compete with Russia in supplying wheat and flour to the Oriental market. A member of the class later brought in a newspaper clipping, stating that the directors of this company were contemplating the construction of several large trans-Pacific freighters. It is obvious that such a question as this is of vital interest, not only to the stockholders of the trans-continental railroads, but also to every man, woman, and child living in the northwestern states.

3. But notwithstanding this widely distributed utilitarian value of certain detailed facts and general principles, could it not be urged that, in the large, the utilitarian value of any subject of instruction is a specific value for special occupations? The sailor needs sailor geography and sailor mathematics, the importing or exporting merchant needs commercial geography and commercial arithmetic, the farmer needs agricultural physics, the engineer needs mathematical physics, and so on. There can be no doubt of the general validity of this contention. On the other hand, there are a number of facts and principles that every one may apply to the needs of life, no matter what his special occupation. In practice, a compromise may be reached by making this latter class of facts a part of the elementary instruction and reserving the first class for the secondary and higher schools. This has been the policy for some time as far as the colleges and universities are concerned. It is now the tendency to specialize secondary education in accordance with the needs of the community. The commercial high school has become a typical feature of secondary education in the larger commercial centers. Manual-training high schools are looking after another field of applied science. In Wisconsin the county agricultural high schools are serving the interests and needs of the farming communities. In this way the specific occupations are being provided for and secondary education is undergoing a wholesome and much-needed reform.

4. (*b*) *Conventional Values.* The prominence of certain items of the curriculum is to be justified, not by the utility of their facts and principles in actual application to the problems of life, but rather by the condition that ignorance of these facts and principles brands a person as uneducated, and hence serves to militate against his maximal efficiency in society.

The study of grammar is perhaps the best instance of formal instruction, the main value of which is conventional. A sentence that is grammatically incorrect may express one's thought,
ne's meaning, just as clearly as a sentence that is grammati-
ly correct, yet habitual use of incorrect forms — disregard
nventional requirements — will distract the attention of
uditors from the thought to the form, and hence militate
e maximal efficiency of expression. It is clear, also,
mar possesses a modicum, at least, of utilitarian value,
ny cases the incorrect form is inferior to the correct
e manner in which it conveys meanings. An ungram-
ntence is frequently obscure and equivocal, clumsy
urate. But, generally speaking, the value of gram-
correct expression is purely conventional, although
he less important and deserving of attention.

ographical knowledge, too, is certainly "assumed" as part
e intellectual equipment of every one who would claim for
his thoughts and opinions the consideration and respect of the average man. One who does not know, for example, that the earth is round will surely be handicapped in his dealings with others; for in social intercourse men and women generalize on slight bases, and the man who has proved himself to be ignorant upon so common a branch of knowledge as geography will receive scant attention upon other matters. The elementary school owes it to the individual to furnish him with those geographical facts and concepts that "every one must know."

A certain conventional value also attaches to correct spelling, although here, too, the utilitarian value is also in evidence. The misspelled word not only reveals one's "ignorance," but frequently it may obscure one's meaning. Arithmetic may be said to have but a slight value from the conventional standpoint. Literature, on the other hand, is extremely important in this light — far more important in the schools from the conventional point of view, probably, than from any other. The "classics" are studied (or, better, dissected) because they are things that one must be familiar with. Not to have heard of them, at least, is to lack the first essentials of culture. This interpretation of their value is natural, but unfortunate.

5. (*c*) *Preparatory Values.* The traditional Herbartian notion that ideas assimilate ideas possesses a certain measure of truth. It is natural to expect, therefore, that facts and principles may have a certain value as bases for the acquisition of other facts and principles. This value may be termed preparatory.

The preparatory value of arithmetic as a basis for the higher mathematics, and as a useful implement in dealing with natural science, needs no especial justification. The study of the mother tongue is also important as a groundwork for the study of foreign languages.

The significance of this value is, however, most clearly revealed in the study of geography. As a recent writer[1] has said: "History is not intelligible without geography. This is obviously true in the sense that the reader of history must learn where the frontiers of states are, where battles are fought, whither colonies were dispatched. It is equally, if less obviously, true that geographical facts very largely influence the

[1] H. B. George: *The Relations of Geography and History*, Oxford, 1901, p. 1.

course of history." The study of geography is also essential to a rational understanding of "current events." Not to evaluate current tendencies with some degree of intelligence is certainly not to prove one's self efficient in society. In this day, when an occurrence on the other side of the globe may immediately and directly influence the humblest citizen on this side, the ability to read newspapers intelligently needs no elaborate argument for its defense. And the ability to read newspapers intelligently certainly demands not a superficial, but a thorough knowledge of geography, as the contemporary happenings in the Orient abundantly testify.

Even more important is the relation of geography to natural science. Geography borrows many of its facts from different fields of natural science — from geology, meteorology, astronomy, botany, zoölogy, *et al.* In the high school and college, each of the sciences is treated in and for itself as a pure science, — that is, without explicit reference to its economic and human relations. It is generally agreed, however, that the initial study of a science should be from its economic, or human side. The child should be introduced to facts and principles in their relation to his life, to his needs. The law of apperception demands this, and this is what geography attempts to do. In a sense it may be looked upon as an introduction to all the sciences of nature. It is here that the child must get that first large view that should precede all detailed and abstract study. Educators are now coming to believe that the curriculum should include geography, not only as a preparation for the sciences, but also as the culmination of all scientific study. The student should bring together the facts and principles that he has acquired in the detailed study of the various sciences, and discover their relations to human life. This is only a consistent application of the general principle that mind begins with large wholes, passes from these to detailed parts, and then back again to the wholes — analysis followed by synthesis, differentiation followed by integration.

6. (*d*) *Theoretical Values.* Items of knowledge that have little or no significance in the practical affairs of life, from either a utilitarian, a conventional, or a preparatory standpoint, may nevertheless be necessary to a *system* of knowledge. The importance of organization and system as important factors in efficient recall has been emphasized in a former chapter. Very frequently, in organizing knowledge into a coherent whole, it is necessary to insert many facts and principles that have in themselves little practical worth.

This, as already suggested, is the justification of a very large part of the educational curriculum. It is hardly too much to say that three fourths of every subject of instruction has absolutely no value when measured by the standards already discussed. A large part of its value is purely theoretical, — that is, it contributes to the coherence of the various facts and principles *as knowledge.* Its value cannot be disputed, for any attempt to "cut out" the "impractical" parts invariably results in the inefficient functioning of the remainder. Short courses that aim to give only the essentials, fifth-rate colleges and normal schools that educate you while you wait, are sufficiently damned by their own products. The muse of science is a jealous mistress. She demands all, and if she fails to get all, she gives nothing in return for whatever she may receive.

7. (*e*) *Sentimental Values.* Inquisitiveness in man is an instinct. Like all instincts, it owes its existence to the forces of natural selection working upon fortuitous variations in nerve structure. It has been "good" for man to be curious about his environment, to study his environment, and to determine the laws that govern its

phenomena. Primitive man did not realize, probably, that his inordinate curiosity was good for him. In his own crude way he investigated things for the mere "fun of it," — for the pleasure it afforded him. Later in his development he came to find out that many of the facts that he discovered and many of the laws that he worked out were "good" for him — that the knowledge thus gained helped him to solve the problems of his life. But this appreciation of the value of inquisitiveness came only after a long lapse of time.

The desire to satisfy curiosity is thus seen to lie at the basis of knowledge. The child evinces this desire. His curiosity is boundless, and upon this native instinct the educator must build. It is clear from our previous discussion, however, that he cannot depend upon it entirely. The very fact that it is an instinct means that it runs its course in passive attention. It is not sustained, directed, organized. All these things mean active attention, mean *work*. Curiosity soon tires, but any measurable addition to knowledge involves persistent effort.

It is the problem of the educator, then, to replace this instinctive curiosity with a higher mental process. The desire to obtain knowledge is not to be discouraged, but it is to be held to a definite line until results follow. Wherever possible, of course, the child's curiosity should be directed along lines that will help him most in his future adjustments. There are times, however, when this curiosity may be directed toward ends the practi-

cal significance of which is not once apparent. Some pupils, for example, may be curious in certain special directions. They may evince a desire, perhaps, to learn all that they can about Arctic exploration. The facts that they obtain may not be applicable to any of the problems that they will be called upon to solve, yet no sensible teacher would think for a moment of curtailing this interest. He has here the opportunity to replace instinctive curiosity with a higher mental attitude, intellectual interest. This is a form of what is technically termed in psychology, *sentiment*. It is rather unfortunate that this term must be used, for it popularly connotes something shallow and "silly." Psychologically, however, a sentiment is one of the highest forms of mental activity.[1] It is emotion, refined and idealized.

The sentiment of intellectual interest is closely akin to other forms of sentiment, such as appreciation of art, music, poetry, and the drama. None of these is in itself practical, yet each subserves a very practical end. Without some form of pleasure, life would be impossible. It is a pretty fallacy (preached mostly by the rich) that one toils like a drudge for a competency and then enjoys one's self. Life, however, is not built upon this plan. Pleasure is a means to an end, not an end in itself. Biologically it may be looked upon as a bribe to keep one alive and in good spirits until one's life work is accomplished. The individual instinctively seeks pleasure,

[1] Cf. E B. Titchener: *Primer of Psychology*, ch. xii.

and if the higher forms of pleasure have not been cultivated, he must fall back on the lower pleasures, — the pleasures of the senses, the satisfaction of instinctive desires, the insidious lines of least resistance.

The enlightened educator realizes this fundamental truth, and he attempts in his practice to develop the sentiments. This is done most consciously in the field of the æsthetic sentiments — the appreciation of music, painting, and literature. These subjects form just as legitimate a part of the elementary school curriculum as arithmetic and reading and writing. But the teacher should certainly not forget the intellectual sentiment, — the pleasure that comes from knowing, — and it is for this reason that no wise teacher would think of curtailing the child's interest in such a subject as Arctic exploration. With a little trouble, he may lead the child to take delight in a purely intellectual pursuit, just as with a little trouble he may lead the child to see the beauty in a great picture, or a classical musical composition, or a world epic.[1]

The foregoing paragraphs explain the criticism that was suggested on a former page concerning the teaching of literature for its conventional value. The educational value of literature is not primarily conventional, but rather sentimental and ideal. The aim in the study of literature should be to enable the pupil to enjoy it, not to have him cut it up and mutilate it, nor to have him look upon it as a medium for communicating useful infor-

[1] This is in addition to the function of art to inspire the individual to higher ideals.

mation in an agreeable form. But, as with everything else that is worth while in this life, the appreciation of the higher forms of art is not a simple thing. It demands some degree of active attention, some element of work, before it can be acquired. It is a mistake to think that art appeals to every one simply because it is art. There are thousands of men and women who get no pleasure out of the great pictures, or the great poems, or the great musical compositions. Many affect enjoyment, because they have a dim sort of notion that it is the "proper thing." But not a few are frank enough to say that they see nothing in art to "rave over." And yet, once developed through a process of active attention, the æsthetic and intellectual sentiments become a source of the highest kind of pleasure.

8. From what has been said it might be inferred that education has neglected the values that we have termed "theoretical" and "sentimental." This is not altogether true. The briefest examination of the curricula of the secondary schools and colleges will serve to demonstrate the importance of these values in the higher departments of education. The larger part of these curricula is made up of subjects that subserve one or another of these two functions: tending either to develop intellectual and æsthetic interests or to make more comprehensive and complete the body of knowledge. The science, mathematics, language, and literature that occupy so prominent a place in the higher education can be justified only upon these grounds. Here, indeed, as we have intimated, they are, or have been, perhaps, too prominent, and a reaction in favor of the utilitarian

may work a wholesome change. In the elementary school, on the other hand, we find the other extreme. The bulk of the time is here given over to arithmetic and language, the latter including reading, writing, composition, and grammar. Literature and geography, with a modicum of music and drawing, divide most of the remaining time between them. Arithmetic is justified entirely by its utilitarian and preparatory values, language by its utilitarian and conventional values, geography by its utilitarian, conventional, and theoretical values, literature mainly by its conventional value, and music and drawing by their sentimental value.[1] Just as a readjustment in favor of the more practical values has been important to the efficiency of higher education, so a readjustment in involving a more explicit recognition of the sentimental values would seem desirable in the elementary schools. This would not mean the introduction of more subjects, but rather a reform in methods of teaching.

[1] To those who are troubled by the cry, now so seldom heard, "Art for art's sake," the following expression from John Addington Symonds may be comforting. "I had composed these lectures for what I most abhor, an audience of cultivated people. This is a paradoxical confession I am nothing if not cultivated, or at least the world expects only culture from me. But in my heart of hearts I do not believe in culture except as an adjunct. 'Life is more than literature,' I say. So I cannot, although I devote my time and energy to culture (even as a carpenter makes doors or a carver carves edelweiss on walnut wood) regard it otherwise than in the light of pastime, decoration, service" — Quoted in H. F Brown's *Life of John Addington Symonds*, speaking of lectures delivered in 1877 on "Florence and the Medici."

PART VI. THE TRANSMISSION OF EXPERIENCE AND THE TECHNIQUE OF TEACHING

CHAPTER XVI

The Transmission of Experience in the Concrete: Imitation and Objective Teaching

1. Up to this point, the educative process has been treated mainly from the standpoint of the individual who is to be educated; it must now be viewed from the standpoint of the teacher who is to control and direct this process. The remaining chapters will consider the various ways in which the teacher may lead the child to acquire experiences, the present chapter dealing particularly with the transmission of concrete experiences through imitation and objective teaching.

2. (*a*) *Imitation.* It is instinctive for the child to imitate the processes that he sees going on in the world about him. It seems to be a fundamental law [1] of psycho-physics that an idea or a perception always tends to work itself out in action: the child's concrete experience of witnessing a given process is applied instinctively in a repetition of that process. It has already

[1] Often called the "law of dynamogenesis"; see J. M. Baldwin: *Mental Development: Methods and Processes*, pp. 165 ff.

been shown [1] how education lays hold of this primary instinct and turns it into the acquired interest of construction. But education also makes other uses of imitation. Indeed, there are those [2] who maintain that imitation is the fundamental principle, not only of education, but of all mental development. There is a danger here as elsewhere, however, of taking an extreme position in magnifying a given factor, if not beyond its theoretical significance, at least far beyond its practical significance. And, after all, education is not so much concerned with the development of imitation. Imitation is an instinct and needs either utilization, transformation, or elimination — not development.

Probably the most important truth for the teacher to realize in connection with imitation is this: the child imitates that which he admires. And the practical application of this truth involves, not only the provision of good models for imitation, but also, and more fundamentally, *the leading of the child to admire and emulate these models*. The first point has been adequately emphasized and even overemphasized by educators during the past decade. The latter point has been very sadly neglected.

Thus in impressing correct forms of speech, it is not sufficient to provide good models of speech. In addition it must be

[1] Cf. ch. vi, above.

[2] Baldwin, *op. cit.*, chs. ix–xii; see also an admirable critique of Baldwin's theory in King, *op. cit.*, ch. x.

assured that bad models do not appeal the more strongly to the child. Many children hear good language in the home and in the schoolroom, but they hear crude language on the street and on the playground. More than this, it is safe to say that the crude forms appeal as a rule the more strongly to the child. There is not a real boy but strenuously abjures what he considers the niceties of personal bearing and speech in favor of the swaggering air, the crude phrases, and the coarse jests of his boyish heroes. The uncultured strata of society stand for arrested development and so approximate the plane of childhood. It is natural that children should be attracted more strongly to representatives of these strata than to the representatives of culture and learning, with whom they have no common bond.

Nor would the sane educator have it otherwise, — for the time. There is a period of childhood when the prim niceties are distinctly out of place and when the little prig who practices them is justly frowned upon as precocious and unnatural. But this does not mean that education is to neglect the crudities of speech and manner, or to permit them to persist. Slowly but surely the child must be led to admire and emulate the higher forms of life, and even before this point is reached, education can see to it that the cruder models are at least clean and wholesome rather than base and degrading.

3. *Imitation and Habit Building.* Imitation is an important factor in the initial stages of habit forming. It will be remembered that the fundamental principle of habit forming is focalization and drill in attention. It is only after a long period of practice that the stimulus "sets off" the reaction automatically. For a long time, the stimulus must be met with a concrete idea of the appropriate movement, — a process that involves the

essential conditions of the practical judgment. In the development of a typical motor automatism, such as walking or speech, the first incentive will probably be furnished by imitation. The child notices these processes going on in the world about him and makes an effort to repeat them. As King[1] says: "He gets more or less vivid images of the activity of other children or of adults. These images, by the very fact that they have been selected out of an infinite complex of images, indicate their affinity to certain impulses to action on the part of the child that are struggling for expression." That is, the process that he sees is coincident with some impulse that he feels for similar movement. Imitation gives him the cue, as it were. It selects impulses at the appropriate moment and turns them into social channels. To the extent that the sight of the process stimulates these impulses into action, imitation may be looked upon as an important practical judgment initiating habit.

But in the further development of habit, imitation probably plays a very minor part. The adjustment once made with a fair degree of success, further details are improved by a recall of the experiences of the first and subsequent movements rather than by a recall of the process that the child has witnessed in another person. The process of habit forming, once started by imitation, goes on by what may be called the "method of trial and error." Each successful effort forms a new expe-

[1] King, *op. cit.*, p. 121.

rience that can be revived and applied concretely to the next trial. Each unsuccessful effort also forms an experience which, when revived on a future occasion, serves to inhibit the movements that before proved unsatisfactory.

All school activities that we group under the head of manual training (including writing, drawing, sloyd, etc.) and moral training (cleanliness, industry, silence, etc.) are important from this point of view. Here the aim is to train the muscles to certain specific adjustments, and the only way in which this can be done is by imitation, trial and error, and persistent practice. The task of the teacher is to provide a good model in the first place, and then to keep the child constantly returning to the process, frequently comparing the results of his work with the model, until proficiency results.

4. *Imitation and Apperception.* The fact that the child imitates that which he admires is only a concrete expression of the principle of apperception. Imitation depends first upon focalization, and a process is imitated the more readily if it is seen to have a distinct and vital relation to the needs of life. Certainly these needs may not always be economic needs. In very early childhood, processes are imitated with great pains, not because their purpose is perceived, but because they coincide, as King says, with an inherent impulse.[1] Here the needs that operate to select "copies" are primitive and innate.

[1] The writer has observed a two-year-old girl carefully wipe certain chairs that had just been dusted, but scrupulously avoid touching those that her mother's duster had not yet reached.

But education, as has been pointed out, must get the child as rapidly as possible beyond this blind and purposeless stage to a plane where the needs will be of a higher order.[1] Imitation still operates here, but in the form of constructive interest rather than in the form of primitive imitation. In other words, the model must be copied with a purpose, and the more vital the purpose, the greater will be the motive for copying the model faithfully.

This is clearly seen in the current methods of teaching drawing. Objects that possess intrinsic interest to the child have almost entirely replaced the "type forms" once so generally used. True, there is still a place for the type form, *but not until the pupil can see that its use will subserve a distinct end.* This point will obviously not be reached until he can grasp a rather involved mediation of means to ends, — in short, until he has attained the plane of conceptual judgment.

Similarly, in manual training, the formal exercises, such as whittling to a straight line, planing a board to a smooth surface, constructing typical joints, etc., without having in view the construction of some definite and useful object, are justly giving place to a more rational treatment which assumes that the child will learn best how to make these adjustments if he has in mind something that he wishes to make and then sets about to make it. His product will be crude enough at first, but it will

[1] Cf. ch. vi, above.

supply a motive for painstaking practice that will ultimately lead to good results. Here again the formal exercises have a place in the later stages of instruction when the pupil can perceive something of their value.

The use of models in written composition is subject to the same conditions. One reason for the paucity of results in this field of education is the lack of a vital motive. Merely to write a letter or a composition for the sake of writing is not a task for the average adult to enthuse over, much less the average child. President Hall has said that no written work should be undertaken in the schools the need for which does not originate in the child himself. This is profoundly true, but the practical question arises, How can this need be supplied? This question is so important in the work of the elementary school that space may profitably be given to a few suggestions that have proved valuable in the writer's experience.

(*a*) The narrative form of composition seems to afford a more natural avenue of expression in children than the descriptive or expository forms. The writer has noticed that the majority of children will respond enthusiastically to the suggestion of an imaginative story. Here the need is perhaps furnished by the instinctive tendency to "day-dream."[1]

(*b*) The construction of little dramas that the children are later to enact furnishes a very powerful motive for painstaking

[1] Cf. Theodate L. Smith, in *American Journal of Psychology*, 1904, vol. xv, pp. 465 ff.; also, S. W. Eaton: "Children's Stories," in *Pedagogical Seminary*, 1895, vol. iii, pp. 334, 338.

work in composition. This device is employed rather generally at the present time, although the tendency to utilize "ready-made" dramatizations frequently eliminates its most important virtue. Needless to say, the drama that is worked up by a class of twelve-year-olds will be a very crude affair, but it is in the recognition of its crudities through later comparison with better models that an important motive for improvement is secured.

(*c*) The "lantern lesson," which is sometimes employed in the teaching of geography, should certainly be noted in this connection. In some of the larger cities, each school is supplied with a small stereopticon, and sets of slides illustrative of geographical topics are kept at the central office. The teacher who wishes to give a lantern lesson consults the catalogue of slides to find out what topics are represented by the pictures. Each child is then assigned one of the topics and works up a two or three minute talk upon it, consulting all available authorities and sources in his search for materials. At the period assigned for the lesson, he is responsible for presenting his topic clearly, concisely, and entertainingly. The value of this exercise from the standpoint of language training as well as from the standpoint of geography is plainly apparent. In schools that lack the advantages of a stereopticon, the same principle can be effectively applied in picture lessons of the usual type. With the wealth of illustrative materials so easily culled from the magazines or so cheaply purchased from dealers, the teacher could easily keep on hand a complete stock of pictures adapted to all the important chapters of geography. These would best be mounted on large cards of uniform size and filed away in card-catalogue fashion. Needless to say, such a device will miss much of its virtue if used too frequently.

(*d*) For letter writing, a very simple device is to arrange with another school for a correspondence club. Here the spirit or instinct of emulation is strongly appealed to.

(*e*) Finally, in the upper grades and in the high school the school paper will furnish a motive for careful literary construction.

If the pupil has a motive for expression, the employment of models for helpful imitation in matters of form will be simple enough. The danger of plagiarism, while not serious, is certainly to be counteracted. To th end, it is probably well that the pupil should do his t without the model at first, and then compare his o crude results with the better form.

5. *To summarize:* Imitation is a primitive instinct which, in early childhood, operates without consciousness of purpose in the repetition of adjustments noticed in others. The constructive imitation of later childhood operates with consciousness of purpose to make more nearly perfect an adjustment, especially when the need of perfection is apparent to the child. Both the primitive and the acquired forms of imitation are valuable in initiating habits.

6. (*b*) *Objective Teaching.* This is exemplified in the concrete study of local geography, in school excursions to stores, factories, transportation depots, docks, etc., in the educational use of museum materials, and in laboratory and "demonstration" exercises. Its aim is primarily to give the pupil rich, vivid mental "pictures" of concrete realities. Its virtue lies in the fact that it involves an acquaintance with objects through several sense channels — through sight, hearing, pressure, strain,

and perhaps even taste and smell. For the purpose of impressing vivid and enduring experiences, it is, as a rule, superior to instruction through pictures and models.

7. The fundamental principle that conditions the success of objective teaching is a corollary of the law of apperception. One who visits a museum or makes a trip into the country acquires educative experiences in direct proportion (1) to the preparation that he has made in the way of preliminary study, and (2) to the effort and attention that he puts into his observations. The average museum visitor gets very little from his casual inspection of specimens, because he brings to this inspection nothing but ignorance and idle curiosity. The same is true of the hordes of people who wander from building to building at the great industrial expositions, subjecting themselves to thousands of different stimuli, of which even the few that reach the threshold of consciousness fail to make an abiding impression; and when, after conscientiously examining their daily allotment of those exhibits that are reputed to be worth seeing, they betake themselves to the Midway or the Pike, they heave a sigh of relief to think that the duty has been performed and that a little real enjoyment has thereby been earned. Those who gain anything worth while from the great World's Fairs or from minor exhibitions are those who are deeply interested in some one particular field and who limit themselves to the exhibits that illustrate this field. The farmers at the county fair study and com-

pare different strains of stock and different specimens of products. They are able to bring to what they see a well-organized complex of specific apperceptive systems. Demonstrations in chemistry and physics would probably hold the attention of young children, but they would be of little educative value unless the observers had had some previous training or instruction in these sciences. The ceaseless activity of the great freight depots is interesting enough to the casual on-looker merely from the fact that life and movement naturally solicit passive attention; but he who is to educate himself in any appreciable measure from such experiences must first get beyond this primitive state of mind.

It seems clear, then, that objective teaching will miss its purpose if it permits itself to be deceived by the visible signs of attention and interest. Here, as elsewhere, effective acquisition is directly proportional to the degree of effort involved. It is clear, too, that objective teaching should always be preceded by a preliminary exercise which aims to make explicit the apperceptive systems that are to be utilized in interpreting the new impressions.

8. *The School Excursion as a Type of Objective Teaching.* The school excursion is extensively used in the study of home geography, sometimes with excellent results. In some communities, public sentiment is somewhat against the excursion, but it is safe to say that where this useful educational device is not employed, the fault is generally with the teacher and not with the par-

ents. It is very much easier to study geography in the class room than it is to trudge over fields and hills with full responsibility for keeping thirty or forty active children out of mischief. But the educational possibilities of the excursion are so numerous that the attendant difficulties should not be permitted to stand in its way.

Four general rules may be laid down for the successful conduct of the school excursion: (1) It must have a definite end in view; there must be something in particular to be studied — the course of a river, the formation of a talus slope, the action of weathering upon rocks, the work of a creamery or brickyard. (2) It must not attempt too much; a single land feature or a single local industry will be enough for one excursion. (3) It must be held within the limits of its original purpose; it is a school exercise and not a picnic. (4) It must be succeeded as early as possible by a full and complete discussion leading to a series of definite propositions summing up the net results.

The following excellent suggestions relative to the school excursion are cited from the Indiana *State Manual:*[1] —

"(1) Invariably a teacher should make the visit herself and find out all the conditions to be met before taking a class.

"(2) She should plan the excursion with more care than any ordinary recitation, foreseeing exactly what facts she desires her pupils to note, and in what order.

"(3) Before starting out with her pupils she should acquaint them, as a rule, with the main questions that are to be answered

[1] Compiled by Fassett A. Cotton, Indianapolis, 1904.

by the excursion. For instance, if a dairy is to be visited, some of the questions in their minds might be: How are the cows housed? What is their feed? How is the milk cooled? How is it bottled? What precautions are taken for cleanliness? How is the milk brought to customers? Or, if a valley is to be visited, the pupils should be asked to observe trench form, bluffs, streams, channels, banks, moving sediment, and flood plane, with the purpose of bringing out the idea of how the stream works and the results of its work. Only the leading questions need be held in mind on their way, and no attempt on the part of the teacher should be made to answer these questions beforehand.

"(4) Some of the parents in the community should be invited to assist the teacher in conducting the children. They will get new light as to a teacher's difficulties, and as to the value of the excursions. An excursion affords an opportunity for one of the best kinds of parents' meetings.

"(5) Now and then during the observations the children should be halted, brought into a group, and led to consider certain points in regular class-room fashion, even though they be standing on the side of the street or along an open ditch. On the return of the excursion, the points noted should be reviewed and connected.

"The excursions should be taken, at least partly, and often wholly, during regular school hours, this being an essential part of the programme."

9. *Museums.* The visiting of museums in communities where such institutions are available should form an important avenue for objective teaching. Here, again, the necessity of having a definite object in view is paramount. Museums generally contain such a wealth of material that a general inspection is largely

without profit. As a rule, perhaps, the museum should be used to illustrate objects and processes with which the children are already somewhat familiar through the ordinary work of the schoolroom. A class studying South America may profitably spend an afternoon in a museum which contains specimens of South American fauna and flora, restricting themselves entirely to this division and resisting the numerous temptations to wander off into other alcoves. The zoological gardens of the larger cities and the unique Shaw Botanic Gardens of St. Louis are really museums, and their pedagogical utility depends on the principles just noted.

The *school museum* certainly deserves mention in this connection. This adjunct is, perhaps, as important to the elementary school as is the school library, particularly in those sections where well-equipped general museums are not available. Through an exchange of products between widely separated communities, valuable collections may be made at a merely nominal cost. Such collections might well contain specimens of minerals, of different kinds of soils, of woods used in building and cabinet making, of textile and other manufactured products together with the raw materials from which they are made, and as complete a representation as possible of these materials at different stages of manufacture. To this equipment could be added stuffed animals, pressed plants, cabinets of insects, specimens preserved in alcohol, and the like, for illustrating chapters in natural history.

It is perhaps well to keep such specimens in places where the pupils will not be likely to become familiar with them until they are to be used in class exercises. Otherwise the element of novelty, which is extremely important in all forms of objective teaching, is apt to be lost.

10. *The School Garden.* This important medium of objective teaching has been so thoroughly exploited in the past few years that little need be said concerning it in this place. Like all forms of "manual training," it involves the factor of actual motor adjustment, so profoundly significant to adequate apperception. The close contact into which the pupil is brought with the processes of plant growth and cultivation will furnish him with a concrete idea of the basal industry of husbandry that he would fail to get from the most vivid descriptions or pictorial representations. From the standpoint of the city child, the "school garden" doctrine is one of the most promising advances that have been made in present-day education.

11. *The Laboratory.* Laboratory methods vary so much with different subjects of instruction that it is quite out of the question for any one writer adequately to treat of them. In general, the laboratory has two quite distinct functions: (*a*) it serves the purpose of illustration and demonstration by bringing the pupil into a direct, first-hand acquaintance with the objects and processes with which he has already been made somewhat familiar through formal instruction; and (*b*) it

provides situations and environments from which the more advanced student may draw conclusions and work out for himself the laws and principles that govern the world of matter. It is the former function that should be treated under the head of objective teaching, and its use in this connection is subject to the general conditions noted above. The principles governing the latter function will be more thoroughly discussed in Chapter XIX.

12. *The Limitations of Objective Teaching.* The fact that attention is attracted and held more successfully by the objective and moving than by the subjective and static not infrequently leads to an overemphasis of objective teaching. The devices that have just been noted have an important place in education, and especially in the preadolescent stages, where one of the leading aims is to impress vivid, concrete images. But the matter can be easily overdone, even here. The mind that has learned to lean helplessly upon the objective factor will always be weak and flaccid unless a strenuous effort is made to induce conceptual and subjective processes. Concrete images must always be looked upon as nothing more than necessary but totally subordinate means to a much higher end. Teachers have been so frequently urged to avoid the abstract that they themselves are almost afraid to think in abstract terms: witness the flabby "sense" psychology and the diluted milk-and-water "treatises" that constitute the bulk of our educational literature! Education will never become the

dignified profession that it hopes to be until the rank and file assume a different attitude toward the principles of their calling.

Grant Allen, in a posthumous essay on Spencer, characterized this master as one who thought and talked in principles rather than personalities. Huxley made the same remark concerning Darwin. Throughout the history of the race, intellectual progress has ever been away from the sensuous and concrete, and toward the ideal and abstract. The education of the child must follow the same line. The pretty pedagogical dogma that education should "begin in the concrete, continue in the concrete, and end in the concrete" is probably, next to "education through play," the most pernicious proposition for which the new schoolcraft must render an accounting.

CHAPTER XVII

THE TRANSMISSION OF CONDENSED EXPERIENCES: DEVELOPMENT AND INSTRUCTION

1. IN a former chapter, the pedagogy of the concept was briefly treated. It was there pointed out that, in every case, concepts must be built up on a basis of concrete experience, but that, once these concepts are adequately developed, they may be manipulated in judgment with little or no explicit reference to the experiences on which they rest. Judgments thus formed may be applied to the solution of concrete situations, hence it is an important duty of education to provide the individual with a supply of such judgments representing the most usable portion of experiences that generations have found to be serviceable.

There are two distinct methods of providing these judgments: (1) they may be given to the individual preformed; or (2) the individual may be placed under conditions that will impel him to form them for himself. The former procedure may be termed the *indirect method,* or the *method of instruction;* the latter, the *direct method,* or the *method of development:* in the one the judgments are given ready-made, in the other the pupil is led to

form judgments *de novo* — is led, in other words, to "reason."

2. It is clear that progress is rendered possible by the fact that we may assimilate and turn to our own use certain of the judgments that have been worked out by our predecessors. In this way we profit, not only by our own experience, but also by the experiences of others. If this were not the case, each would have to repeat, step by step, the monotonous history of those who had preceded him, subject to the same sources of error and making all the mistakes and blunders that they had made. But through the organization of experiences in judgment form, the mistakes are gradually eliminated. Each generation inherits from its predecessors innumerable systems of judgments which represent years, perhaps centuries, of selection and elimination. It is hardly too much to say that, for every fact and principle that survives, a thousand false judgments and erroneous principles have been eliminated. The former constitute our intellectual heritage; the latter have been forgotten.

Education must raise the child to the intellectual level of the race by endowing him with this intellectual heritage. This cannot be done altogether by leading him to repeat the history of the race and to organize for himself the experiences thus gained. It remains, therefore, for the educator to adapt his methods to existing conditions. He must do his best in the brief period during which the child is at his disposal. The judgments that

one makes for one's self certainly function more efficiently than the judgments that one borrows from others. It is equally true, however, that, if the child should form *all* judgments for himself, he would be severely handicapped as a member of society.[1] It is necessary, then, to effect a compromise between the two horns of this dilemma — to determine under what conditions the direct method of discovery is to be employed and under what conditions we must place our chief dependence upon the indirect method of instruction. This is the practical question that confronts the teacher at every turn: how much of this material shall I have my pupils work out for themselves, and how much shall I tell them?

3. An answer to this question will inevitably savor not a little of dogmatism, for as yet scientific investigation has not touched this important field. Consequently, dependence must be placed in the main upon that type of experience that we have termed "common sense."

First with regard to *facts*, — judgments representing reaction to concrete situations, — it is obvious that there are many such judgments that the individual will be

[1] Rousseau proposed to carry this theory to the extreme in the education of Emile. "Let him not learn science," he says; "let him invent it" (*Emile*, iii, 173). "Emile will never know optics. He will never have dissected insects: he will not have counted the spots on the sun: he will know neither microscopes nor telescopes. Your learned pupils will deride him. They will not be far wrong; because, before using these instruments, I mean that he shall invent them, and you are right in believing that this will not be early" (*Emile*, iii, 223). — Cited by J. P. MONROE: *The Educational Ideal*, Boston, 1896, p. 166.

unable to obtain through his own experience. All the facts of history and most of the facts of geography belong to this class; the pupil has nothing for it but to take them on faith. There are also many facts that the pupil might possibly verify by actual experience, but which may just as effectively and much more economically be taken on the testimony of others.

On the other hand, there are many facts that the pupil will do well to discover for himself. In the cases cited in Chapter X, for example, it is far better for the pupil to see for himself the conditions under which seeds germinate than to have the facts told by some one who has made the observation for him. It is "far better" for two reasons: in the first place, the situation will make a deeper impression upon him and become more amenable to efficient recall; in the second place, he may, perhaps, form upon the basis of this process some valuable ideals as to observation and experiment in general.

Such instances are not, however, numerous in the work of the elementary school, and, in general, it may be concluded that the realm of individual facts is a legitimate field of the indirect method. Books of description and narration, oral presentations, pictures, diagrams, and models will all be levied upon under the guidance of principles to be developed in the following chapter. This, of course, does not mean that the direct method has no place in this field. It simply means that the indirect method finds *its* chief application here.

4. In the case of *principles* based upon facts, however, the pupil is not necessarily limited to the "borrowing" method. Having particular judgments — the *data* — in his possession, he may work these up into generalizations or principles, and having the generalizations in his possession, he may work back into particulars. That is, he can manipulate judgments by processes of logical reasoning, and so bring them into relation with one another, weave them together by thought connections, and synthetize them into coherent systems. In what manner this contributes to their revival value has already been noted.

The problem, then, is reduced to this: Shall the teacher *ever* do the reasoning for the pupil? If so, to what extent? It is safe to lay down the general rule that *the right of generalization from particulars and the right of inference from generalizations belong to the pupil.* This conclusion is based upon a firm conviction borne out by a great deal of empirical evidence, that the judgments that the pupil makes for himself and puts into systems largely through his own efforts are infinitely more valuable to him than those in which the thought connections are supplied — in which the reasoning is done for him.

This is the main difference between *telling* and *teaching* — between forcing opinions and principles upon the pupil through lectures or text-book quizzes and leading him to work them out for himself through his own active effort. To take a concrete illustration: In a half hour, a fluent speaker, familiar with

his subject, can explain to a class in the seventh or eighth grade why New York is the largest city in the United States. It will take the best of teachers several recitation periods, of a half hour each, adequately to *develop* these reasons with the same class. Yet no one who has compared the results of the two methods will hesitate a moment over the verdict as to which process is the more valuable. The same is true in the case of arithmetic. A teacher may thoroughly explain in a brief period the working of a problem in bank discount. It will take four or five times as long to lead the children to "think it out" for themselves, but the results in the latter case will be eight or ten times as valuable.

Of course these comparisons are more or less dogmatic, and the figures entirely imaginary, but both comparisons and figures are supported by excellent authority. It is to be hoped that experimental investigation will reach this important problem before long, and give us results that will be really worth while. Pending such investigations, however, our only refuge is in dogmatizing on the insufficient data already in our possession.

5. Certainly this principle that the rights of generalization and inference belong to the child is not to be accepted without qualification.

(1) It is folly to assume that an immature child can build up a coherent system of knowledge alone and unaided. The discovery of relations that hold facts and principles together is a task that occupies the highest type of mental activity. Men who can think clearly are few in number, and even when we find them, we find that their capacities in this direction are limited to a restricted field, in which, through specialized and intensive appli-

cation, they have made themselves proficient. If, then, the development method meant that the child should do for himself what trained experts find the greatest difficulty in accomplishing, the task of the teacher would be worse than hopeless.

But if the development theory does not mean this, what does it mean? Simply that the pupil is not to be *told* but *led to see.*[1] The teacher is to guide and direct but not to carry, and the more he eliminates his own *ego*, even from the guidance and direction, the more satisfactory will be the result. Whatever the pupil gains, whatever thought connections he works out, must be gained with the consciousness that *he*, the pupil, is the active agent — that he is, in a sense at least, the discoverer. Unknown to him, however, the insuperable obstacles must be removed. Unknown to him the way must be partially cleared before him.

And so in answer to the original question, Shall the teacher ever do the reasoning for the child? we can answer neither "yes" nor "no." If we mean, Shall one follow out a line of reasoning as one does in a lecture, tracing the various steps through which the conclusion is reached? we should say *seldom*. If we mean, Should the teacher ever help the child by hints, suggestions, and questions? we should say *almost always*. Our criterion must be

[1] Cf. Spencer: "Children should be led to make their own investigations and draw their own inferences. They should be *told* as little as possible and led to *discover* as much as possible." — *Education*, ii.

this: Does the pupil believe himself to be discovering the truth? This is the essential point. As long as he is confident that he is the discoverer, the essential condition of the development method has been fulfilled. In other words, it is the *subjective attitude* of the pupil that is important rather than the *objective process.*

(2) It is clear that the child's rights of generalization and inference do not in the slightest degree relieve the teacher of the task of arranging his own work systematically. This fallacy has caused the development method to fall into disrepute in some quarters. Teachers have interpreted it to mean that the text-book helps the child too much — does too much of his thinking for him. As a result of this belief, pupils have been encouraged to browse around in "sources," nibbling at this thing and that, making acquaintance with a mass of facts and principles that they are supposed to correlate and systematize. As a matter of fact, the child is only confused, and emerges from such a course with little more accurate knowledge than he had at the beginning. It is the function of the teacher to see that the various parts of the course are presented in consecutive order,—in such a way that the pupil cannot fail to see the relations that the teacher desires to develop.

In short it is precisely at this point that the teacher may profitably do some of the thinking for the pupil. It is here also that the text-book has an appropriate function. In the ideal school and under ideal teachers, teacher and

pupil will work out their text-books for themselves as they do to-day in Germany, but under the conditions of American education, this ideal is far in the future. We shall have more to say upon this point in a future chapter. Here it is only necessary to point out that the development method does not do away with text-books any more than it does away with teachers. With the aid that the text-book gives, there is still abundant room for the child to exercise his rights of generalization and inference.

6. *To summarize.* The development method is seldom used alone, but is almost always supplemented by the method of instruction. We may attempt to have the child work out his generalizations and inferences independently, but, in many cases, the facts upon which he is to work must be given to him indirectly, and, at best, not a few of the generalizations and inferences must themselves be matters of *ipse dixit,* or at least explicitly suggested through hints and questions.

Consequently, the indirect method is always important, even under the most favorable conditions, and must be studied carefully, both from the standpoint of theory and from the standpoint of technique. The first problem will be to discuss the different media through which the indirect method works. This will be the task of the succeeding chapter.

CHAPTER XVIII

The Media of Instruction

1. The following classification of the media of instruction is not intended to be rigidly inclusive of all possible forms. It may, however, be comprehensive enough to serve as a framework for the succeeding discussion. The terms employed are self-explanatory.

I. Intellectual transmission.
- (*a*) Language.
  - (1) Oral discourse.
    - (*a*) Lectures.
    - (*b*) Questions and answers.
  - (2) Books.
    - (*a*) Text-books.
    - (*b*) Reference books.
    - (*c*) Source books.
- (*b*) Graphic representation.
  - (1) Models.
  - (2) Pictures.
  - (3) Maps.
  - (4) Diagrams.

II. Emotional transmission.
- (*a*) Literature.
- (*b*) Pictorial art.
- (*c*) Plastic art.
- (*d*) Music.
- (*e*) Oratory.

2. (*a*) *Language.* This is the most efficient medium for the transmission of experience: (1) because it is the most elaborately organized and hence susceptible of the greatest variety of combinations expressing the finest gradations of meaning; and (2) because it employs words which represent condensed experiences or concepts; thus dealing with experience not in the concrete but in the abstract — dealing, in other words, only with essentials.

There are, however, three factors that condition the highest efficiency of language. These factors are especially important in the use of language as a medium of instruction. (1) The first is agreement of meaning. My words represent my own experiences. If they do not represent your experiences as well, we talk at cross purposes. Hence the common saying that there would be few disputes in the world if men could only agree upon terms. Hence, also, the strenuous effort in every science to build up a vocabulary of technical terms the meaning of each of which shall be absolutely unequivocal. An important duty of education in its earlier stages is to give the child a vocabulary. We have already emphasized this point from the conceptual side, but the child needs words not only that he may manipulate his concepts readily in the formation of judgments for his own use, but also that he may assimilate the experiences of his fellows and transmit to others his own experiences.

(2) A second factor that influences the efficiency of

language is the danger of verbalism, which is monest and most pernicious species of formalism is so, easy to juggle with words that the temptation often strong to use words obscurely in order to cover deficiencies of thought. As Talleyrand paradoxically put it, "Speech was given man to conceal his thoughts." From a negative standpoint, this factor is extremely important to the process of instruction.

(3) A third condition of the effective use of language is mastery of forms of combination. There are certain conventional requirements as to the manner in which words shall be put together. Some of these requirements may, perhaps, be neglected at times without interfering materially with the purpose of expression, but in general very decided lapses from conventional forms tend to make expression inefficient. It is therefore an important task of education in its earlier stages to make habitual the use of conventionally correct forms.

3. *Comparison of Oral and Book Instruction.* Experiences may be transmitted either by word of mouth or by written or printed symbols. The former may be designated as the *oral*, the latter as the *book* method. Both are extensively used in the schools, but as books become cheaper and more common, the tendency is toward an increasing use of the latter method. There are those, however, who maintain that this emphasis of book instruction has gone too far, that a certain vitalizing force which oral instruction involved has been

crushed out by the book method, and that the
her should make a strenuous effort to provide more
better oral instruction. That the oral method possesses some marked advantages over the book method is certainly apparent from the briefest study of the factors involved.

(1) It represents the more primitive form of communication. Oral language was used for thousands of years before written symbols were invented. As President Hall[1] puts it "The short circuit from ear to mouth . . . existed for unknown eons before reading and writing," which represent "the long circuit, and, biologically, very recent brain-path from eye to hand." Written language has never even threatened to replace oral language, except in the schools. Its normal function is entirely supplementary, and its field is closely restricted to the territory that oral speech cannot effectively cover.

(2) Viewed from the psychophysical standpoint, oral transmission is the more economical of energy. The delicate eye movements that reading involves require a finer degree of motor coordination, and consequently a more rapid disintegration of nerve tissue, than the adjustments involved in listening. This point is especially important in the lower grades, where the capacity for delicate motor coordinations is only slightly developed, and where undue strain may result in serious and permanent defects of vision. Investigations[2] have shown that practiced readers make from four to five movements of the eyes in reading a line of average length, while unpracticed readers make from two to three times as many movements in covering the same space. Hence the strain is much

[1] Hall. *Ideal School*, p 478; cf *Adolescence*, vol. ii, pp 461–462.

[2] B. Erdmann and R Dodge *Psychologische Untersuchungen ueber das Lesen auf experimentelle Grundlage*, Halle, 1898, p. 50, also E. B. Huey, in *American Journal of Psychology*, 1899, vol. ix, pp 574 ff.

greater with the latter. To require children who have but recently acquired the art of reading to read for any great length of time is certainly unhygienic.

(3) It is generally agreed that oral instruction holds the attention much better than book instruction. The speaker has at his command certain auxiliary means of soliciting attention which the writer entirely lacks. He can adapt his words to the capacity of his auditors, while the writer must have in mind a typical audience, which may or may not materialize. He can take advantage of what might be termed the spirit of the occasion. He can bring in local coloring and incidents to illustrate his points. He can modulate his voice, emphasizing the salient points and minimizing those less salient, thus producing that variety of stimulation to which the "rise, poise, fall" of the attention wave corresponds; the writer's words are practically all upon the same "level" The speaker can, moreover, help out his words by gestures and facial expression, especially the expression of the eyes; or, to put it in another way, the speaker works in three dimensions, while the writer is limited to one.

As an offset to these advantages, the oral method possesses, of course, some obvious limitations. Economical from the psychophysical standpoint, it is far from economical from a financial standpoint. A man can address a million people by writing where he can address a thousand by speech. Books fulfill an indispensable function, and the individual who is ev[illegible] to become independent of direct, personal instruction must learn how to gain thot[illegible] through the printed page. Yet one cannot escape the conclusion that oral instruction is, generally speaking, the more efficient, and there is no doubt that

it should be the principal medium of instruction in the elementary grades. To quote President Hall[1] again: "The child should live in a world of sonorous speech. He should hear and talk for hours each day; and then he would lay the foundations for terse and correct English, and would keep read-writing, as it forever should be, subordinate to hearing and speaking. He would write as he speaks, and we should escape the abomination of bookish talk."

4. *Comparison of Lecture and Question-and-answer Instruction.* These are two types of oral instruction that have found a place in the school, — the lecture method and the question-and-answer, or Socratic, method. For a long time, the lecture method has dominated the higher institutions of learning. In the universities of the Middle Ages, before the invention of printing made text-books possible, and when the vast numbers[2] of students that flocked to the centers of learning made anything like personal contact between student and instructor out of the question, there was no recourse but to the lecture method. University life is always ultra-conservative, and one need not marvel that the lecture method still persists, notwithstanding its admitted pedagogical deficiencies.

[1] Hall: *Ideal School*, p. 479.

[2] According to some authorities, the students attending a popular mediæval university sometimes numbered as high as twenty or thirty thousand. Cf. S. S. Laurie: *Rise and Constitution of Universities*, New York, 1892, p. 155.

Two objections have been urged against the lecture method: (*a*) it offers no scope for active and creative effort on the part of the student or pupil; he takes in but he does not give out; he accepts judgments and trains of reasoning that his instructor has elaborated, but he does not have an opportunity or an incentive to do much reasoning for himself; in short, the lecture method is too exclusively indirect; (*b*) a second objection is based upon the note-taking that the lecture method involves, the contention being that the lecture frequently degenerates into a mere dictation exercise, the instructor reading from his prepared manuscript while the student scribbles down the sentences as fast as they are uttered.[1]

Of these two criticisms, the first is probably the more damaging.[2] At best the student is a comparatively passive agent in the lecture process, although it depends very largely on the instructor whether he is entirely passive. The combination of the lecture with the "quiz" raises the lecture method at least to the level of the text-

[1] Cf. C. De Garmo, in *Educational Review*, 1902, vol xxiii, pp. 109 ff

[2] Professor O'Shea has made a careful investigation of the work of one thousand university graduates teaching in the Wisconsin high schools Of those who made failures in their work, not a few, he finds, can justly ascribe such failure to the application of the lecture method to secondary instruction. This had been the method that they were familiar with in the university, and their first tendency was to lecture to their classes. Out of one hundred principals and superintendents who were questioned upon this point, eighty-five admitted it to be a very common fault among university trained teachers. Cf. M. V. O'Shea, in *School Review*, 1902, vol. x, pp. 778–795.

book "recitation" in this respect. Furthermore, there are certain topics that can be satisfactorily treated only by the lecture method, — for example, the first general view of a science, or an advanced course giving the outlines of a new and special theory. In the latter case, the lecture may be justified on the ground that the material does not exist in book form. In the former case, the lecture may be justified on the ground that such courses should be given by a person who is thoroughly a master of the field; they should also cover the ground in a general rather than in a specific way; because of the first condition, a large class cannot be cut up into sections for individual work, and because of the second condition, a detailed "question-and-answer" process would require too much time.

The second criticism is likewise merited, but the danger that it points to is not inherent in the lecture method. If the student is to make a *verbatim* transcript of the instructor's sentences, he is certainly reducing his share of the instruction to useless drudgery. Note-taking, however, if it be of the proper sort, is not altogether useless. In some measure, it aids in concentrating the attention and, unless slavishly *verbatim*, it introduces an element of active thought in that it involves a condensation of the instructor's materials.

Perhaps the best way to obviate the difficulty is for the student to take a few notes during the lecture and at some later period expand these into a more elaborate form, — utilizing

the material of the lecture in a way that will involve, perhaps, not a little creative effort. This is thoroughly worth while, although, like all good things, it may easily be overdone. (Witness the barren formalism of many "note-book" normal schools.) A large number of courses treated simultaneously in this way will give the student so much writing to do that the sole virtue of the device — the fact that it may promote independent activity — is likely to be lost.

The two great advantages of the lecture method as compared with the question-and-answer method are its definite and systematic character and its economy of time. It is especially well adapted to keep the subject-matter organized and coherent. This advantage is, of course, extremely important in the treatment of difficult sciences.

The question-and-answer, or Socratic, method escapes many of the pitfalls of the lecture method, but has one or two faults peculiar to itself. Its main virtue is that it demands the reciprocal activity of pupil and teacher. While it may involve note-taking, this feature will necessarily occupy a subordinate position and will not, in any case, degenerate into a dictation exercise. This method is especially well adapted to combine the method of development with the method of instruction. The combination is known as the "development lesson," and its technique will be discussed in Chapters XIX and XX.

The disadvantage of the question-and-answer method is its tendency to become discursive, to wander from the

point. It requires great skill on the part of the teacher; in fact, the art of teaching probably finds its widest scope in the application of this method. By the same token, it is the pitfall of weak teachers.

Among some educators there is a superstition that the question-and-answer method is the only true method of instruction. This exaggerated view finds expression in the unwillingness to impart information in any way save by Socratic questioning. Valuable time is spent in attempting to get children to discover unimportant truths, under a vague and hazy notion that it doesn't matter much what the truth is so long as the child discovers it for himself, and so anxious is the teacher to have him discover it for himself that he spends twenty or thirty minutes in a "pumping" process to get a result which could have been stated in as many seconds.

It is this tendency to "beat about the bush" that constitutes the most dangerous pitfall of the question and answer method. Some judgments are not worth developing, they may better be stated as clearly and tersely as possible The danger of confusing the pupil with a mass of details is also a source of some inadequate results in the application of this method by unskilled teachers. If the teacher is himself incapable of keeping system and unity in his thinking, he will find that his pupils cannot do it for him.

It is for all these reasons that the question-and-answer method is likely to fail most lamentably if the teacher does not make adequate preparation for each lesson Questions must be carefully worked out beforehand and arranged in the proper order, so that successive phases of the topic will be developed consecutively. One cannot trust to the inspiration of the moment for this factor. This is true even when the subject of instruction is developed over and over again at intervals of a year or half year. The teacher who has got beyond the necessity

for a strenuous daily preparation has outlived his professional usefulness.

To summarize: While the question-and-answer method is not the only method of imparting instruction, it is perhaps the most important, especially in elementary education. It can, however, be carried too far, and its successful application requires a high degree of skill on the part of the teacher.

5. *Comparison of the Relative Values of Different Book Methods.* While oral instruction possesses some marked advantages, it is clear that it is not in itself adequate to the needs of education; it must be supplemented by book instruction. The difference between text-books, treatises, and monographs has already been indicated. It will be remembered that the last named is the original record of the investigator and observer to whom we owe the fundamental facts and principles of any special science. It embodies the judgments that he has made upon the basis of direct experience. The text-book and the treatise, on the other hand, represent syntheses of judgments borrowed from many sources. The knowledge that they embody has been worked over by a number of different minds and is presented in a form very different from that which it first assumed. We have now to compare the use of these two classes of books as media of instruction.

It might be argued that, if direct experience is the best way in which to gain judgments, the source method,

representing as it does judgments that are only one remove from original concrete experiences, would be the next best way. Upon such a presupposition, the ideal method in geography would be to lead the child to study the first-hand reports of travelers and explorers rather than to read accounts that have been compiled from these reports. In history, it would seem that the original records, written by actual participators in or observers of historical events would form better media of instruction than treatises or text-books upon history worked up by writers who live at the present time. This general position has been seriously maintained by certain educators as applicable even to the work of the elementary school.

It is doubtless true that the source method has a legitimate use at all stages of instruction, but it is seriously to be doubted whether its function in elementary education should be anything more than supplementary. The proper interpretation of source records is a task that demands the experience and skill of a specialist. All available records must be carefully studied and compared with a view of determining and accounting for individual differences, for no two men see the same thing in exactly the same way. The task of the worker in source materials is to effect a compromise between conflicting or inconsistent reports, and to do this successfully requires a sifting of evidence that is far beyond the capacity of the adult layman, let alone the child. The treatise and the text-book may not represent the absolute

truth, but even the poorest specimens represent a closer approximation to the truth than the child, with the aid of the average teacher, is likely to reach. This does not mean, of course, that the child is to give up his rights of generalization and inference. It simply means that there are some fields where the exercise of these rights is out of the question. What the child lacks in any case is the historical, or the geographical, or the scientific perspective.

What, then, is the field of the source method in the elementary school? Certainly source materials may be used for illustrative purposes. A contemporary account of the battle of Bunker Hill, taken by itself, would probably be misleading. But it could not fail, if read in connection with an authoritative account drawn by an expert hand from all available sources, to add a touch of reality and vividness to the total effect. In the same way, geographical sources — books of travel, records of exploration, consular reports, industrial and commercial statistics — may all be used to supplement the regular text book work, but the text should manifestly be the center of the study. It should form the outline, the framework, upon which the more complete knowledge may be built.

We may conclude, then, that the text-book is the chief medium of book instruction in the elementary school, at least, and that here the source method should be used, not as a basis for judgment, but to add vividness

and life to the facts that the text-book presents. The great danger that inheres in the use of the text-book is the danger of verbalism. How this may be combated and how the text-book may be used in connection with the method of development are questions that must be left for later treatment.

6. (*b*) *Graphic Representation as a Medium of Instruction.* Besides language, the work of instruction involves such media as maps, pictures, models, diagrams, etc. Graphic representation in any of these forms attempts to reproduce in some measure the features that the visual observer would meet in direct experience. It might be thought that the photograph would represent the most faithful form of reproduction, but this is not necessarily true. Just as the actual observer will emphasize certain features by an act of attention, so the picture that represents most faithfully the view of the observer will emphasize the characteristics that he emphasizes and minimize the characteristics that he neglects. It thus follows that, for purposes of instruction, the photograph may not be so valuable as the drawing.

The picture, then, may possess an advantage over the real situation itself, in that it brings out in strong relief the features that instruction would emphasize. It relieves (or may relieve) the observer of the task of seeking these salient characteristics for himself. The picture approaches the diagram accordingly as it performs this service in greater and greater degree. The

diagram is a picture that presents only the essentials. The non-essentials are left out for clearness' sake.

The principle that underlies the use of these media of instruction is simple enough. Facts, judgments, are to be drawn from them just as they are to be drawn from actual situations. Practically speaking, they represent aggregate ideas which must be solved by the judgment process.

It is safe to say that most teachers derive little aid from the pictures that the text-books employ. They look upon them merely as means of diversion and amusement. This is a serious mistake. The picture should be made an object of study in the same manner as the actual situation represented by the picture, were the pupils able to face it directly. Take, for example, a picture in a geographical text-book, representing an elevator at Duluth. If the teacher and his pupils were on the docks at Duluth, the situation could easily be turned to educational account. In a certain measure the picture may be turned to the same account. What is in the elevator? Where did the grain come from? How? In what way is it handled? Why are the steamers here? Are they loading or unloading? Where will the steamers go after they have received or discharged their cargoes?

Pictures, like travel, will avail but little if only the passive attention is appealed to.

If models, maps, and diagrams may be looked upon as pictures, with everything left out that might obscure the salient features, they are, as it were, aggregate ideas partially worked out and only waiting to be expressed in judgment form. Consider, for example, the diagrams

representing the connections of fiber tracts in the central nervous system. They are not copies of what the microscope would reveal — as the student quickly discovers when he passes from the text-book to the laboratory. The same principle applies, however, to the study of diagrams and models as would apply if they were the actual things themselves.

Needless to say, the various forms of graphic representation are subject to the same limitations as other media of indirect education. Just as the working out of judgments for one's self increases their revival value, so studying a picture in which all the salient points are *not* forced upon one's attention may involve an element of active effort which will increase the value of the process. Needless to say, also, diagrams and models may, with great value, be constructed by the pupils themselves. The making of an illustrative diagram or model is one form of expressing a judgment.

7. *The Media of Emotional Transmission.* Concerning this second large rubric in our outline, there is space to say but little. There is obviously a difference between language used for purely intellectual purposes and language used for emotional purposes. Similarly, there is a difference between pictures used to represent situations that we cannot actually face and pictures that rank as works of art. Yet the emotional type, like the intellectual type, represents a medium for the transmission of experience. Just as I assimilate from Nansen's

record of his explorations something of his experiences in the far North, so I assimilate from a reading of "Pendennis" something of Thackeray's experiences with the world at large. And just as, in looking at a newspaper cut of a battle ship, I have in some measure the experience of the man who drew the picture, so in looking upon the Sistine Madonna I gain something of Raphael's experiences.

And yet there is a radical difference between these two types, notwithstanding their similarity of function. If I had been with Nansen and if I had had an adequate scientific training, I could have seen about the same things that he describes. And if I had been with the newspaper illustrator as he drew the picture of the battle ship, I could have seen it practically as he saw it. But I might have lived side by side with Thackeray during his entire life and missed the subtle observations with which "Pendennis" charms us; and even though I had seen Raphael at work upon his masterpiece, even though the models which he used were before my eyes, I could not have seen in those models what Raphael saw.

The media of intellectual transmission and the media of emotional transmission stand, then, upon different levels. The latter transmit experiences, not with situations as they would appeal to any man of average intelligence, but with situations as they would appeal to the artist, the poet, the seer,—with sensuous materials it is true, but sensuous materials tinged by an emotional,

a personal, coloring. The essential characteristic of intellectual transmission is its constancy, its invariability. It represents what the average man would see under similar conditions. The essence of emotional transmission is its inconstancy, its ultravariability. It represents what only one man in a million, perhaps one man in a hundred million, would experience. This is the difference between scientific exposition and literature, between photography and art.

8. It has been pointed out above[1] that emotional experiences function in two important ways: (*a*) they form the essential ingredients of ideals; and (*b*) they lie at the basis of the sentiments or the higher forms of pleasure. This dichotomy furnishes the cue for the educational interpretation of art. All forms of artistic expression are media for the transmission of emotional experiences. In teaching literature, music, and similar subjects, one is apt to overlook this fact and to apply the methods that one would apply in the teaching of geography and grammar. It is not uncommon to see a class in the upper grades or in the high school "studying" classic literature for facts, criticising it upon a factual basis, subjecting it to the indignity of paraphrase and condensation, and treating it in general as they would a text-book. If the great pictures are not abused in the same way, it is because the picture does not lend itself so readily to this formal and curriculized treatment.

[1] See chs. xiii and xiv, above.

Yet it is not uncommon to see a "picture lesson" in the elementary school devoted to bringing out a few facts about the artist, data as to where the picture was painted, where the original is kept, how much it is worth, and numberless other bits of information — valuable, no doubt, in a way, but utterly insignificant in comparison with the revelation that the picture has in store for one who can understand and appreciate.

Still more reprehensible is that "analytic" study of a great picture which merely attempts to enumerate the objects represented. The writer has heard the following questions asked concerning Millet's "Gleaners": How many women do you find in the picture? How many horses? What else do you see in the picture? etc. In a language book intended for use in the fourth grade, the following questions appear with reference to the same picture: "In the foreground are three peasant women, what are they doing? Describe their dress and tell how they carry the gathered grain. For what do you think they will use the grain when gathered? How will it be stored? For whom do you think they are working?" Most of these questions certainly add nothing to one's appreciation of Millet's art, and as far as useful information is concerned, they fall far below the standard of the teacher who used this picture to draw a lesson on the superiority of the "self-binder" of our Western wheat fields over the primitive harvesting methods of the European peasantry!

9. The mission of art is not to instruct in the intellectual sense of the term, but rather to please, to reveal, and to inspire. It transmits experiences of the emotional order, and the only way in which it can fulfill its function is by infusing into the individual something of the spirit that moved the artist to its creation. In other words, the media of emotional transmission must be met with an emotional interpretation.

CHAPTER XIX

TYPICAL FORMS OF DEVELOPMENT AND INSTRUCTION: (*a*) THE INDUCTIVE DEVELOPMENT LESSON

1. THE principles that have been developed in the preceding chapters have much to do in determining the *form* of the various school exercises. Those exercises that have form and structure may be termed, generically, "lessons." Fundamental differences in form imply fundamental differences in function, and successful teaching is conditioned in no small degree upon an adequate understanding of the structure and functions of typical lessons. The following classification will serve as a basis for the subsequent discussion: —

(1) The Development Lesson.
    (*a*) The Inductive Development Lesson.
    (*b*) The Deductive Development Lesson.
(2) The Study Lesson.
(3) The Recitation Lesson.
(4) The Drill Lesson.
(5) The Review Lesson.
(6) The Examination.

2. *The Development Lesson.* The function of the development lesson is to lead the pupil to the formation of a concept or judgment through a process which shall, as far as possible, utilize the direct method. When it is necessary to use the indirect method, questions and answers are employed rather than lectures.

There are two distinct varieties of the development lesson: (*a*) the *inductive,* which develops (1) concepts from particular experiences, (2) particular judgments or facts from concrete aggregates, and (3) general judgments or principles from particular judgments; and (*b*) the *deductive*, which develops particular judgments from more general judgments. Neither of these classes is necessarily exclusive of the other; that is, in one and the same lesson, one may use both inductive and deductive processes. The terms simply indicate the general character of typical lessons. One may be inductive as a whole and yet employ deductive processes in places; another may be deductive as a whole and yet employ inductive processes in places.

3. *The Inductive Development Lesson.* This type of lesson has been thoroughly worked out by the followers of Herbart upon the principles laid down by Herbart himself. In its present well-organized form, it is an organic unity made up of a number of articulated parts known as "formal steps." That is, the inductive development lesson falls into a number of logical subdivisions, each with a specific function to fulfill in promoting the purpose of the lesson as a whole.

Herbart[1] originally suggested four steps: (1) clearness, (2) association, (3) system, (4) method. By the step of *clearness,* he meant the grasping of separate details, one by

[1] J F Herbart. *Schriften zur Padagogik*, Leipzig, 1851, Pt. i, pp. 49–51; English trans., *Science of Education*, Felkin, Boston, 1896, pp. 126 ff.

one. In our own terminology it represents the first analysis of the aggregate idea. At this stage, mind differentiates particulars, and views each of them in and for itself.

In the step of *association*, mind passes from the individual or particular elements, thus isolated, to the discovery of common qualities or relations which bind the isolated elements together.

System is an orderly reconstruction of the elements upon the basis of the relations discovered. In our terminology it represents the solution of the aggregate — the formation of a judgment. Herbart very distinctly points out that the relations are not present in one's first perception of an aggregate, but come out only in the process of division and recombination.

Method is the application of the judgment thus formed to new situations. It is the supreme test, as it were, of the whole process. In his own rather obscure way, Herbart laments the fact that, after judgments are formed, they are seldom used. "Method," he says,[1] "is for most men merely a name that they have learned. Their thinking hovers uncertainly between abstraction and determination. They follow sense-stimuli instead of relations. They associate similarities and rhyme *thing* with *concept*."

The formal steps, as thus suggested by Herbart, are seen to be a fairly accurate description of the way in which mind goes to work to form judgments. As noted above, the formation of a judgment involves a process of analysis, of comparison and abstraction, and of generalization. The formal steps, as they have been worked out by Herbart's followers, usually employ these terms in place of clearness, association, and system. Application is also substituted for method. Herbart's schema

[1] Herbart, *op. cit.*, p. 51; English trans., p. 128.

has been modified in other respects, but mainly in the manner of amplification, so that the structure of the development lesson as it stands to-day follows, in the main, Herbart's original outline.

The principal changes may be briefly noted. Ziller[1] recognized that an aggregate is not made up entirely of perceptual material, but that, connected with every situation that we face, we have certain predispositions with which experience has provided us. Therefore the aggregate is always partially perceptual, partially ideal. Ziller maintains that it is necessary to discriminate in the work of instruction between these two phases. He, therefore, divides the first step (clearness) into two parts (1) *preparation*, which is concerned with the working of old experiences to which the new are related, and (2) *presentation*, which is concerned with the new material.

Rein[2] adds a substep which he calls the *statement of the aim*, and which, according to his view, should precede the step of preparation. There are good reasons, however, for placing it at the close of the first step.

The structure of the Herbartian development lesson, as it stands to-day, may be briefly outlined as follows: —

First Step . . .	Preparation
Substep . . .	Statement of the Aim
Second Step . . .	Presentation
Third Step . . .	Comparison and Abstraction
Fourth Step . . .	Generalization
Fifth Step . . .	Application

[1] T. Ziller *Grundlegung zur Lehre vom erziehenden Unterricht*, Leipzig, 1884, see C. De Garmo: *Herbart and the Herbartians*, New York, 1896, pp. 103 ff.

[2] W. Rein *Outlines of Pedagogics*, Syracuse, 1895. (English trans.)

The numerous books treating of these formal steps — especially the excellent treatises of De Garmo,[1] the McMurrys,[2] and Rein[3] — would make their detailed consideration superfluous in this place. We shall therefore limit ourselves to a brief description of each step, attempting especially to show in what manner its structure and function are related to the principles already discussed.

4. (1) *The Step of Preparation.* The purpose of the preparation is to revive whatever ideas the pupil may already have in his possession regarding the topic to be treated. These ideas may be and probably are more or less vague and inaccurate. They may have been gained from a multitude of different sources — from concrete experience, from books, from the conversation of the home, from previous school work. Whatever their character or source, however, the only condition that they must fulfill in order to be admitted as part of the preparation is this: Are they *pertinent* to the matter in hand?

It follows from this that the preparation is not necessarily a review of the work done at the preceding lesson; indeed, it may include material that has never been mentioned in class before. From the standpoint of apperception, the step of preparation is *the making explicit of all apperceptive systems* that may operate in assimilating

[1] C. De Garmo: *Essentials of Method,* Boston, 1889.
[2] C. A. and F. M. McMurry: *Method of the Recitation,* New York, 1903.
[3] Rein, *op. cit.*

the new experience. It attempts to give the pupil the appropriate attitude or adjustment toward the new situation.

Suppose, for example, that the lesson has for its object the development of the principle that vapor condenses with a fall of temperature. The preparation would naturally involve the explicit revival of those experiences that the pupil has had touching this phenomenon. That is, he has had certain experiences in which the phenomenon was implicit, but not explicit. He has seen the vapor from his expired breath condense upon the window pane. He has seen the vapor from the teakettle condense on reaching the cold air. If he lives in a mountainous country, he has seen rain or snow falling upon the mountains when it did not fall in the valley. The teacher now directs his attention to these experiences without telling him, perhaps, what he is to do with them.

Or, suppose the object of the lesson to be the development of the definition of the adverb. The preparation in this case may well review the definitions of other parts of speech already studied, with especial emphasis upon the adjective and verb. If the concept *clause* is to be developed, the stage of preparation will bring again to the pupil's mind the concepts *simple modifier* and *phrase modifier*.

It goes without saying that the dominant method of this step is that of questions and answers. The teacher is to draw out the desired experiences by means of well-directed questions that will suggest rather than tell.

In the first illustration cited above, the teacher may introduce the lesson somewhat in this way: "What happens when you blow your breath against a cold window pane? At what other times have you seen 'steam' gather on window panes?

Are the kitchen windows covered with steam every time the washing is done? On what kind of days have you noticed that this doesn't happen?" etc.

For the development of the adverb, the questions will probably be rather more formal. For example: "Point out the verb in this sentence. Define a verb. Point out the adjective. Why is it an adjective? What word does it modify? What do you mean by *modify?*"

The time that the first step occupies should be brief. The tendency of the teacher is generally to draw it out to an unjustifiable duration. A general rule may perhaps be laid down that the step of preparation should occupy not more than one fifth of the time allotted to the entire lesson. This rule would not hold, of course, if the development were entirely concerned with working over old experiences. A development lesson of the inductive type may be entirely concerned with old materials, involving the presentation of no new matter whatsoever, and the object being to "digest" the old experiences and recast them in judgment form. In such cases, the revival of the old experiences may well occupy a much larger fraction of the recitation period than has just been allotted.

The danger to be guarded against is wandering from the point. In all forms of the question-and-answer method, it is easy to let the discussion run into irrelevant channels. This is a doubly serious source of danger where the pupils do not know what the questions are leading up to, as is the case in the preparatory step.

5. (1 *a*) *The Statement of the Aim.* McMurry[1] has the following to say in discussing the function of the aim: "A good aim becomes a *standard* both to the children and to the teacher for judging the worth of the contributions by the former. Since this first step is necessarily conversational, there is always danger that the conversation will degenerate into a conversation that aims at nothing and accomplishes nothing. But when all are conscious of a fixed aim, reference to it by the teacher or pupils will determine whether or not a certain thought is worth their attention."

Our conception of the function of the aim differs slightly from that of McMurry. The step of preparation makes explicit the apperceptive systems that are to operate in assimilating the new material. The aim should *show the need* of the new material *from the pupil's standpoint.* Both the preparation and the statement of the aim combine to fulfill the conditions of apperception. The aim really forms the connecting link between the old and the new, and this seems to indicate that the appropriate place for it is at the end of the preparatory step rather than at the beginning. Of course there will be exceptions to this rule in practice. It may sometimes be expedient to state the aim at the very beginning of the lesson. Especially would this be the case if the lesson is concerned with working up old materials exclusively.

[1] McMurry, *op. cit.*, p. 113.

Put in another way, the function of the statement of the aim may be said to be twofold: (1) to center the minds of the pupils upon the problem in hand, and (2) to arouse their "interest" in the new matter to be presented. The first phase demands that the aim be *definite* and *pertinent.* It should state as clearly as possible the point that the lesson is intended to make. This does not mean that the conclusion of the lesson — the generalization — is to be stated formally as the aim. If it were, it would be meaningless to the pupils. The generalization is intrinsically and necessarily an abstract statement. The aim, if it is to fulfill the second condition named above, must be *concrete.* It should, as has been said, relate the forthcoming subject matter to the needs of the child; that is, *it should seize upon some need and show how it may be satisfied.*

For example, in the lesson upon the condensation of vapor, it may be assumed that the preparatory, informal conversation concerning various well-known phenomena of condensation will have aroused in the pupils a curiosity to know the cause of these phenomena. The preparation will not have fulfilled its function if some such result has not been gained. The aim should then be so stated that the pupils will understand that the following steps are leading up to an explanation of this thing that puzzles them. Thus the aim may take some such form as this, "To-day we shall try to find out *why* the 'steam' gathers when we breathe upon a cold window pane, and why the 'steam' forms at the mouth of the tea-kettle."

Similarly, in the lesson on the adverb, the preparation should have brought out the facts (1) that the adjective is one form of

modifier, and that it makes clearer the meaning of the noun or pronoun, and (2) that no method of making clearer the meaning of the verb has yet been discussed. "The adjective makes clearer the meaning of the noun; is there a class of words that will help the verb in a similar manner?"

McMurry[1] very properly emphasizes *brevity* and *attractiveness* as essential features of a good aim. It goes without saying that a long and involved aim defeats its own purpose in that it fails to concentrate the pupil's attention and arouse his interest. For the same reason, the aim should be attractive and couched in simple and, as far as possible, non-technical terms.

6. (2) *The Step of Presentation.* The purpose of the step of presentation is to impart the new experiences from which the generalization or judgment is to be derived. These may be either concrete experiences from which facts are to be discovered and then worked up into generalizations, or they may be particular judgments — facts themselves — given by the indirect method.

The treatment of the condensation of vapor will furnish an illustration of the former type. A few simple experiments may be performed in class. The pupils may breathe upon warm and cold surfaces, and note the results. They may watch the boiling of a kettle, noting the fact that the cloudiness is not apparent until the steam has reached a certain distance beyond the spout. They may note the gathering of moisture on the outer surface of a pitcher of ice water. In general, the aim will be to give as many particular instances of condensation as possible, and to arrange the examples so that the relation

[1] McMurry, *op. cit.*, pp. 109 f.

between the fall of temperature and the phenomenon of condensation will be readily perceived. Each case is to be observed carefully in and for itself, and the results of each observation should be formulated in a judgment which may, perhaps, be written upon the blackboard This should be done, at any rate, whenever the number of particular judgments is large.

In the lesson on adverbs, the facts will be brought out by a study of sentences containing adverbs. In such a procedure, each sentence becomes a center for observation, just as the separate experiments were in the former illustration. Either the sentences may be written upon the blackboard with blank spaces which the pupils are asked to fill in with words that make the meaning of the verb clearer, or the teacher may write complete sentences containing adverbs, from which the pupils, having disposed of the other words, may be led to see that the adverb does for the verb what the adjective does for the noun.

Where graphic representations — pictures, maps, models — are used in place of real objects, the method does not materially differ. Thus, in the study of geography, it may be desired to build up the judgment that deltas are formed at the mouths of rivers entering inclosed seas or gulfs rather than at the mouths of rivers entering the open ocean. The pupil discovers the particular facts concerning each delta from the map, precisely as he would from the actual situations if he had the opportunity. From a series of pictures representing types of different races, the leading physical characteristics of the various races may be inductively determined just as they could from a study of the types themselves. The

same holds for such development work as the determination of the zones by use of models representing the sun and earth.

In all these cases the pupils discover the facts for themselves, as well as search out the relations between facts upon which the generalization is based. In the case of facts that are given indirectly, the step of presentation is usually concerned with the imparting of such facts either by a lecture or through the text-book, and their illustration by as many concrete references as possible. In the case of the text-book, the presentation is usually covered in the "study period." In such an event, the preparation and the statement of the aim are involved in the *assignment*, while the recitation proper is given over to the comparison and generalization. This type of lesson is frequently employed in the inductive study of history. Here the pupils become acquainted with the facts before the recitation period, and this period is then devoted to a discussion of the facts. Thus the preliminary study lesson becomes the step of presentation in the development lesson.

The *method* of the step is, therefore, either direct or indirect, according as the facts are discovered by the pupil himself or gained indirectly through a lecture, text-book, or some other medium of instruction. In the former case, there is still something of the indirect method, for the attention of the pupils must be directed by carefully put questions to the points that are espe-

cially to be observed; and some things will, of course, be told outright.

While organization is obviously the factor upon which one must mainly depend in all forms of development work, the concrete experiences with which the step of presentation frequently deals may also function in practical judgment. Hence, it is always well to give these experiences the added advantage of vividness.

The *time* to be allotted to this step varies much more than in the step of preparation. Where the presentation has been covered by the previous study lesson, it is necessary only to recall the facts as briefly and concisely as possible. When concrete materials are being studied, however, it will be necessary to devote a large fraction of the total time to the presentation — perhaps in some cases as much as one half. Obviously this step should be the last to be hurried. Upon the wealth and vividness of the details the value of the judgment will depend, and to hurry over the presentation will be simply to encourage hasty and inadequate generalization.

7. (3) *The Step of Comparison and Abstraction.* This forms the important transition from the details into which the aggregate has been analyzed to the reconstruction of the aggregate in the judgment. In practice, the step of comparison frequently fuses with the step of presentation, inasmuch as attention to the details can hardly fail to emphasize the points of resemblance and difference. Ordinarily, however, it is well to dis-

criminate between the two steps in practice as well as in theory. As the terms sufficiently indicate, the function of this step is to make explicit the relations which individual facts or particular experiences bear to one another.

In the lesson on the condensation of vapor, after the concrete cases have been presented, the facts that they reveal must be compared with one another. If the individual judgments have been placed upon the blackboard, these may be referred to. In any case, questions will be asked to bring out the salient points: "Do we find that breathing on a window pane always results in the formation of 'steam'? When does it and when does it not? Where does the water come from that thus forms upon the pane? Why do we not see it ordinarily in the expired breath? Are there any cases other than those that we have described in which it becomes visible? We found that moisture sometimes forms on the outside of a cold pitcher; where does this come from? Under what conditions does it appear? Why do we not see it in the air ordinarily? Can we ever see it in the air? What did you notice about the steam that came from the kettle? What do you think it looked like in the kettle? If it was not cloudy in the kettle and did not become cloudy until it was some distance from the spout, how can we explain the cloudiness?" Having brought out the fact that, in every case, the invisible moisture becomes visible only when the temperature falls, the relation may be made even more explicit by one or two general questions: "What, then, can you say about the appearance of moisture in all these cases? Sum up the results of our study of these different cases."

The step of comparison in the lesson on adverbs may be similarly conducted. In the presentation, attention has been called to a new class of words. "What do all these words that

we have just pointed out do? Are they like any other class of words that we have studied? How? In what respect do they differ from adjectives? Look at them again; in what respect does the first one help the verb? the second?" and so on,—the examples having been supplied to illustrate place, time, and manner of action.

It will be noted that the relations are to be sought, not only between the different elements of the new material, but also between the new and the old. This comes out particularly in the lesson on the adverb. In the treatment of grammar, the procedure is steadily progressive, the various parts of speech being developed with reference to one another and working together to form a completed whole, the sentence. In such a case, the development of a new form involves a great deal of contrast and comparison with forms previously developed. Adjectives and adverbs can be explained only by nouns and verbs, phrases must needs be related to single words, etc.

The *method* of this step is predominantly direct, the indirect operating as before, through questions and answers, to help out the thought processes of the pupils. The constant aim should be to let the child discover relations as far as possible for himself. Each relation should come to him with the full force of a fresh and original discovery.

This last point implies that the *time* allotted to this step should be sufficient to insure the discovery of the

relations by the pupils rather than their revelation by the teacher. This suggests the danger of trying to accomplish too much in a single development. Generally speaking, one judgment or generalization is all that should be attempted, and even this may have to be extended over two or three periods, — to-day's lesson being devoted to the preparation and presentation, to-morrow's to the comparison and generalization; but as a rule this splitting-up of the development should be avoided as far as possible. The lesson is a time unity as well as a thought unity, and any breaking up of the time element tends to disintegrate the thought. If possible, then, the various steps should be so adjusted to one another as to permit the completion of the lesson in a single period. It is perhaps well to make the presentation and comparison the standards of division, for these steps will generally require the largest share of the period — sometimes as much as three fourths, sometimes even more.

8. (4) *The Step of Generalization.* This step covers the formulation of the judgment as a definition, rule, principle, law, or proposition. It is the final reconstruction of the materials of the original aggregate, — the capstone of the development process. According as the preliminary steps have been pursued faithfully or carelessly, the conclusion will be natural or forced. The ideal lesson will take the pupils so gradually through the various steps that they will reach the conclusion

almost before they are aware of it. The generalization will almost formulate itself.

The *method* of this step should be direct. To the pupil belongs the right of formulating the judgment in which the net results of the lesson shall be summed up; and this for no sentimental reason, but because the act of formulation contributes not a little to the revival value of the judgment. It will be difficult to get the pupil to do this at the outset, and the teacher will be strongly tempted to make the generalization for him. But here as elsewhere patient and persistent work will tell in the end. For a long time, the results will be discouragingly crude. The teacher will frequently have to reconstruct the language before the judgment can be left. But the effort should always be to reduce this interference to a minimum.

In *form* the generalization should be brief. The greatest economy of words consistent with absolute clarity of meaning should be the objective point. The necessity for concreteness and simplicity of statement is not so pronounced here as in the aim. If technical terms have been developed, they may be and should be freely used. The virtue of a technical term is that its use subserves economy of expression; being unequivocal, it does not require a host of explanatory terms to make its meaning clear. Care should be taken, however, to preserve simplicity of construction. Three or four short sentences are better than one long complex or compound sentence.

The *time* allotted to this step should also be brief. With a class that is new to the development method, it will necessarily be longer than with a class that has had some drill in the accurate and concise forms of thought that the method involves, but at no time should the step cover more than three or four minutes.[1]

We have said that the aim should show the pupil the *need* of the solution which the succeeding steps attempt to supply. Consequently the generalization should, in a measure, be an answer to the question raised in the statement of the aim.

In the lesson on condensation, the aim was stated in this way, "To-day we shall find out why the 'steam' gathers when we breathe upon a cold window pane, and why the cloud of steam forms at the mouth of the teakettle." The generalization of this lesson might be expressed in this way: "Air may contain water in an invisible form known as vapor. When the air is cooled, the water becomes visible, forming a cloud made up of a large number of minute drops. This process is called condensation." The way is now clear for another lesson on *precipitation.*

In the development of the adverb, the generalization would take the form of a definition, "An adverb is a word used to modify a verb by answering one of the questions, How? When? Where?" A later lesson could then expand the definition to cover the modification of adjectives and other adverbs.

9. (5) *The Step of Application.* We have pointed out that the generalization represents the solution of an

[1] McMurry's remarks upon this point are exceptionally good. *Op. cit.*, pp. 198 ff.

aggregate and the reconstruction of its materials in judgment form. We have also seen that, while the judgment represents the solution of a present aggregate, it may be preserved and applied to future situations. This process is begun in the step of application. The rule, or the law, or the definition, is worked back to particular facts.

In the lesson on condensation, the step of application might well be devoted to an explanation of certain processes of condensation not noted in the previous steps, — the formation of clouds, for example. This would fit in very well with the following lesson on precipitation Indeed, the two steps, generalization and application, might form the preparatory step of this succeeding lesson.

In the case of the adverb, the step of application would naturally concern itself with the identification of adverbs in given sentences. This in turn would prepare the pupil for a succeeding lesson on the extension of the definition to cover the modification of adjectives and adverbs.

In arithmetic, if a rule has been developed inductively, the step of application would involve the working of problems coming under the rule.

It will be readily seen that the *time* to be occupied in the application will be extremely variable. Generally, perhaps, the entire step will be covered by seat work, only a few suggestions and hints being given at the close of the recitation period. Sometimes an entirely new lesson will be given up to the application. This may, in itself, become a development lesson of the deductive order. Occasionally the step of application will

occupy a share of the time allotted to the inductive lesson proper. It is safe to say, however, that the application in some form should always follow the generalization. The pupil should learn from the start that knowledge as it exists in the form of laws, principles, rules, or definitions is utterly valueless, unless, directly or indirectly, it can be carried over into the field of practice.

10. One truth that the foregoing discussion reveals is that the inductive development lesson is an *organic whole.* Each of the formal steps has its specific function to fulfill in promoting the purpose of the entire lesson, just as each organ of the body has its function to fulfill in subserving the general function of the body as a whole. In the light of this principle, every question, every statement that the lesson involves, should form an integral part of the unified structure. No question should be asked, no statement should be made, merely for the purpose of filling in time or reviewing irrelevant knowledge.

And just as each step and each division of each step are integral parts of the "lesson unity," so the "lesson unity" is an integral part of the unit of subject-matter. Condensation and precipitation are subdivisions of a broader topic, — physiography. Adverbs and adjectives are integral units in the general subject of grammar. The task of the teacher is so to arrange the subject-matter that the lesson unities will follow one another naturally, and so lead the pupil to the gradual and orderly unfolding of the entire subject.

11. But not all the laws, principles, and definitions with which the pupil must become familiar are amenable to treatment by the inductive method. Many must be given outright; others are to be derived deductively from still larger principles. The error of the Herbartians[1] has been to assume that the formal steps represent the sum total of the technique of teaching. Such an assumption is both illogical and impractical. The inductive development lesson has but a limited field of application. It is useful in the development of *some* laws, principles, rules, and definitions on the basis of particular facts. But some lessons have to do, not with rules or principles or definitions, but with the particular facts themselves. Other lessons have to do with moral and æsthetic truths that cannot be reduced to the inductive form. Still others have to do with the formation of habits — with the making of processes automatic. It is safe to say that the last-named type of lesson is far more important in the actual work of teaching, especially in the elementary grades, than either the inductive or the deductive development lesson.

[1] Cf. Rein, *op. cit.*, p. 187, "Because of their formal nature, the formal steps of the recitation have a universal application."

CHAPTER XX

TYPICAL FORMS OF DEVELOPMENT AND INSTRUCTION: (b) THE DEDUCTIVE DEVELOPMENT LESSON

1. THE inductive development lesson is concerned with the formation of principles, definitions, rules, and laws upon the basis of individual facts. The deductive lesson works in the opposite direction — from principles back to facts or less general principles. Its function is either (*a*) to anticipate experience by means of inferences from general principles, or (*b*) to explain or rationalize particular facts upon the basis of general principles. In the one case, it looks forward to the solution of a possible situation; in the other, it brings particular existing situations under the realm of law, representing the solution of an aggregate by the application of experience in the form of a conceptual judgment which has previously been worked out and stored away for just such an occasion.

The deductive lesson is typified by the step of application in the inductive lesson. It frequently happens, however, that the fact to be explained or rationalized does not present itself at the time that the principle is developed. In the study of geography, for example, the principles governing climate are usually developed early in the course of the grammar school. Throughout the remainder of the course, these principles are

being constantly applied to explain the climate of particular regions. In arithmetic, too, principles are first developed on the basis of particular cases, and then applied to a multitude of specific problems.

2. The form of the deductive lesson has not been worked out so thoroughly as that of the inductive; largely, perhaps, because the latter has been held to have universal validity. Nevertheless, the deductive development lesson merits the attention of the student of method, for, as a type, it is probably more frequently represented in the work of the school than the inductive form.

The teaching of geography in the upper grades might be said to make almost exclusive use of this type of lesson. In all the larger text-books there is an introductory treatment of physiography, designed to develop principles that may be used later in deductive lessons. Take, for example, the treatment of the climate of the Andes region. Under the old "telling" method, one or two paragraphs would cover the climatic conditions of the entire region. This would be "set" as a lesson, and the pupils would master it, usually through the factor of repetition. Under the development method, on the contrary, the pupils are led to apply to the particular region under consideration the general principles of climate, and, upon this basis, to infer what its climate will probably be. Reference is then made to the text-book, or to some other source, for verification of the inference. If a discrepancy is discovered, it will be clear that a fallacy has crept into the process of inference, and the problem will be to locate this fallacy and reconstruct the argument to fit the facts.

3. This method of deductive development will take longer than the "telling" method, but it will possess some

important advantages over the latter. (1) It introduces the factor of organization; the detailed facts are no longer disconnected, but are joined together in a rational system, disclosing causal relations. (2) It makes meaningful the principles that have previously been mastered; if these principles are not used in this way, it has been an obvious waste of time to develop them. (3) It supplies a motive for searching out empirical evidence for the inferences made, and therefore makes intelligible the use of text-book and source materials. (4) It brings into the service of education the "puzzle" instinct; this has always been the secret of the pleasure that most pupils take in the work of arithmetic; there is no reason why other subjects of instruction should not be similarly benefited. (5) It opens the way — *reveals the need* — for further study upon the same basis.

In respect of the last point, geography may again be cited as an example. Climate and surface determine productions, productions plus location and facilities for communication determine occupations, occupations plus productions and surface features determine commerce, commerce determines centers of population. Thus, armed with a few general principles, the entire geography of a certain region may be developed inferentially upon the basis of a few data, most of which may be gathered from a careful inspection of the map. The development of each new topic paves the way for the next — creates a *need* for the next.

(6) Finally this deductive process amplifies and extends the inductive process; every fresh application of

a principle widens its scope and gives it a still firmer foundation; in fact, insures still more strongly its general validity.

4. There are two types of the deductive development, each corresponding to one of the functions mentioned above. We may term these (1) the *anticipatory* type, and (2) the *explanatory* type. Each type presents four phases, corresponding, in a degree, to the formal steps of the inductive lesson: (1) the *data*, (2) the *principles*, (3) the *inference* or *conclusion*, and (4) the *verification*. We shall examine these briefly, first with reference to the anticipatory type.

(1) *The Data*. These are the facts with which we start. Taking the lesson on the climate of the Andes region as an example, it is clear that a study of the map will reveal certain salient facts concerning the position and extent of this region which may be brought out by questioning: What is the general direction of the Andes system? Between what parallels of latitude? What zones are represented in this extent? Where is the highland the widest? Approximately how wide at this point? Where narrowest? Compare the eastern and western slopes. Are the valleys high or low? Narrow or broad? What do we term a high, broad valley?

Having completed this preliminary map study, the next step will be to impress other data that are essential to a study of the climate. The altitude of the principal ridges and plateaus may be told by the teacher or gathered from text-books or sources. Having these various *facts* in mind, the next step will be to review the —

(2) *Principles*. What four general conditions govern climate? (Latitude, altitude, distance from the sea, prevailing

winds.) What is the general effect of latitude upon climate? Of altitude? In what ratio does increase in altitude lower the temperature? (Approximately 3° for every 1000 feet.) How does the neighborhood of large bodies of water affect climate? Under what conditions? What are the prevailing winds in the equatorial region? How do they vary with the seasons? What are the prevailing winds in the temperate zones? How do they vary with the seasons?

(3) *The Inference.* According to latitude, what climatic zones would you expect to find in this region? How will altitude affect these conclusions? If the temperature at the sea level on the equator is 98°, what will be the temperature at an altitude of 10,000 feet? 20,000 feet? 5000 feet? How high are the plateaus in the northern Andes? What, then, will be their climate, according to latitude and altitude? In what respect will the prevailing winds modify the temperature of this region? etc.

The temperature of the central and southern portions of the region may then be inferred from similar data. Rainfall will probably be left for another lesson, but it may be inferred from an application of the same principles.

(4) *The Verification.* The inferences having been placed in tabular form upon the blackboard, the pupils may then be encouraged to go to the text-books, encyclopedias, and other sources for empirical evidence that will support or controvert the conclusions. In some cases, the deductive inferences may be found not to tally with the facts. It will then be necessary to search out the causes of the discrepancies. When all disputed points have been cleared up, the tabulated inferences may be modified to meet the facts, and recorded in permanent form in the pupils' note-books.[1]

[1] The writer is indebted to Miss Ella Pond Leland, Critic Teacher in the Montana State Normal College, for this plan, which has been taken, practically entire, from a class exercise in the seventh grade.

Such a plan for a development lesson is obviously amenable to rather wide variation. It is not necessary to bring out all the data, or all the principles, at one time. The influence of latitude may first be considered, and the modifying influence of altitude noted, before the prevailing winds are mentioned. Temperature may be treated apart from rainfall, and rainfall reserved for a separate lesson. One part of a region may be treated as a unit before taking up other parts. But, in general, the procedure will always involve these four stages. Obviously, too, there will be a certain uniformity in the order in which topics are taken up. It would be illogical to treat agricultural products prior to a treatment of climate, because agricultural products depend upon climate.

Other lessons of this type are represented in the solution of arithmetical problems. Here we have a statement of the problem (data), the processes governing the solution (principles), and the solution itself (inference). Mathematical deduction differs from that represented in the lesson on geography, in that the need for verification does not exist, — except, perhaps, in the form of a reverse process (proof), to make certain that no mechanical errors have crept in. This is because mathematical deductions are absolute. Given certain conditions, certain results are bound to follow. In the geographical deductions, certain conditions just as assuredly give rise to certain results, but we can seldom know absolutely that all modifying factors have been accounted for. Hence the necessity for verification and hence the danger of assuming such deductions to be anything more than very probable hypotheses until they have been verified by actual observation.

Objections have frequently been raised to the application of the deductive method to the treatment of a subject like geography. One may say that, at most, we can obtain only shrewd guesswork and that guesswork is something not to be encouraged, to say the very least. The fallacy of this position lies in the fact that "guessing" is assumed to be emphasized in the deductive lesson. As a matter of fact, it is not the guessing that is made to appear important in the eyes of the pupil, but the verification. Nor is it the guessing itself that is dangerous, but rather the failure to recognize that a deductive inference is, at best, *only* a guess. One can do no better in this connection than to bear in mind the words of Huxley,[1] whose mastery of scientific method can never be questioned: "It is a favorite popular delusion that the scientific inquirer is under a sort of moral obligation to abstain from going beyond that generalization of observed facts which is absurdly called 'Baconian' induction. But any one who is practically acquainted with scientific work is aware that those who refuse to go beyond fact rarely get as far as fact; and any one who has studied the history of science knows that almost every great step therein has been made by 'anticipation of nature,' that is, by the invention of hypotheses which, though verifiable, often had little foundation to start with; and not unfrequently, in spite of a long career of usefulness, turned out to be wholly erroneous in the long run."

[1] T. H. Huxley: *Methods and Results*, New York, 1896, p. 62.

5. In deductive lessons of the *explanatory* type the object is not to anticipate facts that may exist, but to explain facts that do exist. Thus in geography, the facts that are presented or discovered must be put into coherent systems, must be *organized*, explained. This is sometimes done by an inductive process, but more frequently it is done by deduction — by bringing them under the operation of general principles. A lesson in the analysis of sentences is a deductive lesson of the explanatory type. The facts, the data, are furnished by the sentences. The process of analysis involves an explanation of the position and function of each word.

Consider, for example, the following exercise: "Hamilton and Burr fought at Weehawken."

Kind of sentence? Simple. Why?

Subject? Compound. Why? Name the subject. Why do the words named form the subject?

Name the predicate. Why does the word named form the predicate?

Modifiers of the subject? None.

Modifiers of the predicate? Adverbial prepositional phrase. Why a modifier? Why prepositional? Why adverbial?

Note here (1) that each element of the sentence is brought under a more general class — the class name is applied to the particular; (2) that the position and function of each element are explained by reference to some general principle; and (3) that each of these processes is purely deductive.

Geography again furnishes some excellent examples of this type of deductive lesson. Assuming that the essential conditions of a good wheat country, a good corn country, a good cotton country, etc., have been developed by a careful inductive study of types in the United States, these principles may then be applied to the explanation of wheat, corn, or cotton belts in other countries. Thus the raising of wheat in European Russia is a fact that may well merit a development lesson of the explanatory type.

Data. Wheat is grown in the central and southern portions of European Russia. Let us see why.

Principles. What conditions have we found to be essential to a good wheat country?

Climate: cool, with sufficient but not too much moisture — at best thirty to forty inches annually, with even distribution. Hard wheat grown only in cool climates with fairly vigorous winters.

Soil: fertile, not marshy, not exhausted. Ground fairly level, for convenience in harvesting.

Other conditions: easy transportation, water preferred; land relatively cheap, population not dense.

Inference. Then if Russia is a good wheat country, it must fulfill these conditions.

Verification. Let us see if this is true. What is the climate of central and southern Russia? What is the nature of the soil? What can you find out about the rainfall? What means for water transportation? What conditions would render land relatively cheap? etc.

It will be noticed that the treatment of the explanatory type of deductive lesson falls into the same subdivisions as the treatment of the anticipatory type. In the lesson on the climate of the Andes region, we started with particular facts of altitude, latitude, prevailing winds, etc.,

and inferred what the climate would be. Then we verified our inference by an appeal to empirical data. In the present instance it is as though we started with the particular fact that the climate is of such and such a nature, and then explained *why* it is thus by reference to latitude, altitude, etc. In either case the lesson is deductive, and *in either case there are distinct divisions between the four* steps, — data, principles, inference, and verification.

Good examples of explanatory lessons are furnished by the teaching of natural science in the high schools. In botany, for example, the principles of chemistry and physics are, or should be, called upon to explain the facts of plant physiology. Suppose a lesson to have as its subject-matter the upward movement of sap through the root and stem of a plant. The principles of osmosis and capillary attraction are at once suggested. The inference will be that some structure of the plant fulfills the conditions required for the operation of these principles. Needless to say, this topic may also be approached inductively; but if the principles of osmosis and capillarity have already been developed in physics, why redevelop them in botany? Here is a fact: the movement of a liquid in opposition to the law of gravitation. What principles have we discussed that will cover this phenomenon? Under what conditions? Then we must infer that these conditions must, in some way, be fulfilled by the plant structure. Let us examine the structure and see how they are fulfilled.

6. It is needless to say that the development lesson, whether of the deductive or inductive type, is subject to the limitations of the development method in general. Broadly speaking, its field in elementary education is limited to the intermediate and higher grades — one may say, approximately, from the fifth grade up. The inductive lesson, in its simpler forms, is in place in the third and fourth grades, as well as in the upper grades. It must be remembered that both inductive and deductive lessons involve reasoning processes, — the formation of judgments *de novo*, — and not only do they involve reasoning processes, but processes of logical reasoning; that is, the formation of judgments upon the basis of other judgments. Until the child can deal readily with condensed experiences, he will be seriously handicapped in such lessons. The primary grades, as we have seen, are the field of concrete experience and the gradual formation of a vocabulary. They are, above all, the field for acquiring an initial mastery of the foremost tool of thought, — language.

CHAPTER XXI

TYPICAL FORMS OF DEVELOPMENT AND INSTRUCTION: (*c*) THE STUDY, AND (*d*) THE RECITATION LESSON

1. THE study lesson is a name that was applied by the late Professor Hinsdale[1] to designate the mastery by the pupil of an assigned portion of a text-book. It may be the step of presentation in the inductive development lesson, or the step of verification in the deductive development lesson, or it may simply be an exercise in which the pupils are gaining particular or conceptual judgments from the printed page. In any case, the principles that condition the successful issue of the lesson are the same.

2. In the general discussion of the book method in a former chapter[2] we noted some of the difficulties that are always involved in this type of instruction. In the present connection, however, only two of these need be considered: (1) the difficulty of holding the attention to the printed page, of emphasizing the salient points, and of introducing variety into the monotony; and (2) the consequent mind-wandering with the resulting temptation to make up for lost time by rote-learning and verbalizing.

[1] B. A. Hinsdale: *Art of Study*, New York, 1900, ch. ix.

[2] Ch. xviii, above.

The technique of the study lesson must aim to overcome these difficulties. The first is the more fundamental, for rote-learning grows out of inadequate apperception, although it is greatly augmented by careless teaching that either accepts text-book sentences quite undigested, or, at most, is satisfied with a paraphrase that just misses the "words of the book." If, however, the attention of the child can be successfully directed to the content, it is probable that the factor of verbalism can be easily eliminated.

3. The study lesson may be divided into two functionally distinct parts: (1) the assignment, and (2) the seat work.

(1) *The Assignment.* This is a preliminary clearing of the road before the seat work begins. Ordinarily it occupies a portion of the time devoted to the previous recitation, although it may often require but a moment or two before the beginning of the study period. Its function is similar to that of the statement of the aim in the inductive development lesson; that is, it should relate the new material to the old, and reveal a need for the acquisition of the new. In doing this it will often be profitable to anticipate, in some measure, the treatment that the book represents. The acme of a skillful assignment is reached when the teacher reveals just enough of what is contained in the lesson to stimulate in the pupils the desire to ascertain the rest for themselves. Just how much this shall be will differ in different subjects and

with different classes. In general, the assignment will be much more explicit and detailed in the intermediate grades, where the pupil is just learning to use text-books, than in the upper grades and the high school, where some familiarity with the text-book method may be assumed. But in all cases the assignment, whether it be brief or full, is an important step which should never be omitted.

In the use of the smaller geography, which is commonly the first book to be employed strictly as a text, the assignment is of the utmost importance. It is hardly too much to say that, in this case, all the material of the text should be carefully developed orally before the pupil is set to work at the book. Even an adult's mind will wander when he attempts to read a text with which he is absolutely unfamiliar and which deals with a science whose technical terms mean very little to him. It is a fallacy to think that a preliminary oral development will curtail the pupil's interest in the text itself. One is interested in what one knows about, not in what is unknown. Independence in the use of the text is the objective point, but this independence cannot come at the outset.

The seat work preparatory to the "reading" exercise forms an illustration of the study lesson, and the preparation for the seat work is a good type of the assignment. During the first four or five years of the pupil's school life, all new words in the reading lesson should first come to him through the ear. The printed or written word is a symbol not of an idea, but of a spoken word. The normal process of interpretation seems therefore to be from the printed word to the spoken word, and thence to the "idea." Hence the necessity for a development of all new words prior to setting the child at work on the reading lesson.

For this development, the teacher has the choice of several

methods: (1) The story covered by the lesson may be told to the class in a brief form, taking care to introduce new words in simple and familiar connections, writing the new word upon the blackboard at the time it is uttered so that the pupils may become thoroughly familiar with its form. (2) If the "thought" of the selection is familiar to the pupils, the new words may be developed through the use of context not directly connected with that of the selection itself. (3) It is always well during the assignment to bring out any connection that may be apparent between the lesson to be read and the experience of the pupils. If the lesson is one upon the intelligence of horses, for example, a period or portion of a period may profitably be spent in a conversation lesson, aiming to draw out the experience of the children with respect to horses, the points that they have noted concerning the horse's intelligence, etc. During this discussion the new words may be introduced by the teacher — suggested, perhaps, in place of a word which the child has used and which may be less effective than the new word. (4) In the case of masterpieces of literature, and especially in the case of poetry, very little attempt should be made to develop the thought and the new words through a paraphrase. It will be much better to read (or, still better, to recite) the poem to the class, pointing out the difficult words and clearing up by explanations the more obscure passages.

At the close of the assignment, every pupil should be able to recognize the words just developed at sight and to give the main points in the thought development.

4. (2) *The Seat Work.* This phase of schoolroom activity — or inactivity — is beyond doubt responsible for much more than half of the serious waste of time that our American system involves. The time spent by the average child in "preparing lessons" is very largely time thrown away. The German schools do away with this

source of waste by eliminating the text-book, but under American conditions it is impossible to adopt this remedy. A large proportion of our teachers are necessarily to be classed as "undertrained." They remain in the "profession" but a few years, and they commonly have but an inadequate preparation on which to start. They are forced to depend upon text-books, consequently the use of text-books must be adapted to the conditions that prevail. The preliminary oral development suggested in connection with the assignment is somewhat of a compromise between the German and American methods.

5. But even a skillful assignment will not always operate to prevent waste of time through inattention. In the beginning, it is necessary every now and again to *direct the pupils' attention to the salient points. This* is best accomplished by means of suggestive questions which may be written upon the blackboard as a guide to the text. The pupils at their seats will read the questions and note the answers that are to be found in the book. The recitation may then be based upon these written questions, although the latter should be supplemented by others of a more detailed nature. After some practice of this sort, the pupils may be encouraged to make out lists of questions for themselves, covering the matter given in the text. This may be rendered even more effective by permitting the child having the best list of questions to "quiz" the class — to turn teacher for the time being. Needless to say, this device must

not be carried too far, for the questions asked by the pupils will inevitably emphasize the minor and less consequential points, rather than the larger thought relations. It is valuable, however, when used temperately, for it enlists the powerful services of the instinct of emulation. The task of the teacher, reduced to lowest terms, is to give the pupil a motive, to show him a need, for tracing out thought connections. Almost anything that will subserve this end is a legitimate implement to employ, if it is not overdone.

6. After some degree of proficiency has been gained in seeking out answers to questions, these may be replaced by topical outlines, which may, in turn, serve as a basis for recitation work; instead of answering a given question, the pupil may "recite" upon a given topic.

7. With practice in study by the topical outline, the pupil may gradually pass to the stage of making an outline for himself. This is an art to which too little attention is now paid in the schools. If the child acquires what might be termed the "outlining habit" early in life, he will in course of time acquire the ability to make a serviceable outline without resorting to pencil and paper — holding his attention over a long series of topics without undue exertion. When he has mastered this art, he has mastered the art of reading. The chances are that he will no longer read, — as many of us do, even in adult years, — following the words faithfully with the eye, while the wits go "wool-gathering." Such a mas-

tery of reading involves, of course, a great deal of hard work, and the road has to be traversed anew for every subject that is taken up; for we cannot think of a generalized habit of study any more than we can think of a generalized habit of neatness or industry. But we may have ideals as to the best methods of study, and these can be developed and sustained only by persistent practice in various fields.

It is, of course, possible to give the pupil unnecessary help in the study lesson and thus to involve one's self in the same danger that was noted in connection with objective teaching. But the marked inefficiency of this work in nearly every school at the present time seems to indicate that the danger point has not yet been reached.[1]

Professor Hinsdale, in the chapter just referred to, gives some excellent advice concerning the assignment He calls attention especially to the necessity on the teacher's part to see to it that the text assigned is within the grasp of the pupil, that the book selected is suitable to the age and attainments of those for whom it is intended, that difficult points be cleared up by oral development, and that the material of the book be carefully worked over by the teacher beforehand and cut up into lessons not by so many lines or pages or paragraphs or chapters, but by sections of equal difficulty and importance.

8. *The Recitation Lesson.* The recitation lesson commonly follows the study lesson and has for its objects:

[1] "At least three fourths of all the time spent by a boy of twelve in trying to learn a hard lesson out of a book is time thrown away" — G. S. Hall *Methods of Teaching History*, Boston, 1885, p 206.

(1) the reporting to the teacher by the pupils of the facts gained in the study lesson; (2) the clearing up of obscure and difficult points by the teacher; (3) the concrete illustration of details; (4) the amplification of the text-book materials by supplementary matter; and (5) the bringing together and summing-up of the net results of the study in a clear and systematic manner. We shall not include under the term "recitation lesson" the class exercise that has already been discussed as the development lesson. Many exercises are given over simply to the impressing of facts as such, rather than to the development of principles upon the basis of facts or the explanation of facts by reference to principles. The recitation lesson, as the term is used here, comprehends only the first of these processes. This type of lesson is met with in all departments of education, but most frequently, perhaps, in the intermediate and grammar grades.

9. The recitation lesson takes two general forms: (1) the question-and-answer recitation, and (2) the topical recitation.

(1) The *question-and-answer* recitation is the more elementary form, inasmuch as the pupil's responsibility for the materials of the text is limited to detailed facts, which are recalled in response to the teacher's questions. Thus the task of keeping in mind the connection between details, which is the chief difficulty in the topical recitation, is not imposed upon the pupil. All that he is asked

to do is to remember separate facts and to reproduce each of them in turn when the cue is given.

10. The *art of questioning* is an important factor in this type of lesson. While this art can be acquired only by persistent and painstaking practice, a number of helpful suggestions may be obtained by a study of questions both good and bad, and by a careful consideration of the principles which condition successful questioning. Professor De Garmo's recent treatment[1] of this general subject is especially rich in concrete illustrations which will repay careful study.

For the specific purposes of the question-and-answer recitation, the following principles and suggestions may be helpful: —

(*a*) The function of the question in this type of lesson is to direct attention to the salient features of the text. That it may not distract the attention from essential to non-essential points, the question should be (1) definite, that is, limited to a particular fact that the lesson brings out; and (2) unequivocal, that is, admitting but one correct answer.

(*b*) The question should be so framed that the answer will fulfill, as far as possible, the conditions of efficient recall. This demands that the question should, as a rule, demand an answer in judgment form, for the clear formulation of experience in judgment is a powerful

[1] Charles De Garmo: *Interest and Education*, New York, 1903, pp. 181 ff.

factor in promoting retention and recall. For this reason, questions are to be avoided that (1) imply the answer ("leading questions"), (2) permit of answer by "yes" or "no," or (3) can be answered with single words. (2) and (3) are subject to many qualifications, and are not to be followed dogmatically. "It is pedantry . . . to banish all questions that can be answered by *yes* and *no*. We need only to be sure that sufficient reason follows or sufficient experience precedes the answer. In other words, the *yes* or *no* should not be a fortunate or unfortunate guess." [1]

(*c*) There is great danger that the recitation lesson will involve almost as serious a waste of time as the study lesson in that only the pupil who is "reciting" will be attentive. *For this reason it is good practice not to call* upon a given pupil to recite until the question has been "put" to the entire class. For the same reason, it is well to avoid a uniform order or sequence, alphabetical or otherwise, in which pupils are called upon. It may be well occasionally to call upon the same pupil two or three times during a single recitation, even if all the others do not have an opportunity to recite. Otherwise a pupil who has finished his recitation may be tempted to "rest on his laurels" and permit his wits to go wool-gathering during the remainder of the exercise. It is also generally recognized as poor practice for a teacher to repeat an answer that a pupil gives. This encourages

[1] De Garmo, *op. cit.*, p. 194.

slovenly and inarticulate answers. The class should be required to depend upon the pupil reciting for the answer to the question, and for the preservation of order and sequence if the recitation is topical.

(*d*) Everything that might, in any way, interfere with the concentration of attention upon the matter in hand must be eliminated or reduced to a minimum. Hence the "marking" of the pupil after each individual recitation is to be looked upon as bad practice; if this is done, it should be at the close of the recitation period.

(*e*) If the question, as put by the teacher, seems to puzzle the class unduly, it is permissible to recast it in another form, but this should not occur frequently. The habit of asking the same question in a half-dozen different ways is sure to confuse and distract.

11. (2) *The Topical Recitation.* The problem of the topical lesson is to lead the pupil to give out the substance of the material acquired from the book, with a minimum of questioning on the part of the teacher. The materials are worked over in the child's mind — apperceived — and expressed in the form of simple, factual judgments following logically upon one another. The more independent the pupil is in this process, the greater will be the value of the lesson. Needless to say, however, this capacity does not come to the child at once. Indeed its development is one of the most difficult tasks that the elementary school involves. It is perhaps best worked up through the method suggested in discussing the as-

signment, passing gradually from detailed questions to "sketchy" questions, and from these to rather detailed outlines; thence by easy stages to schematic outlines. If the recitation follows this order of growth in the assignment, the pupil should be able to give a satisfactory account of himself by the topical method in the latter half of the fifth school year. But the transition from the question-and-answer to the topical recitation need not be a formal affair. The questions may be so framed that they will require answers increasingly comprehensive until they finally pass over into the mere statement of the topic.

CHAPTER XXII

Typical Forms of Development and Instruction: (*e*) the Drill, (*f*) the Review, and (*g*) the Examination Lessons

1. *The Drill Lesson.* The purpose of the drill lesson is to insure the functioning of experience as habit. Consequently the technique of the drill lesson is strictly conditioned by the principle of habit-forming: focalization and repetition in attention. The chief source of danger in this type of lesson is to overlook the implications of this fundamental law.

Exercises in spelling and writing, for example, are commonly placed at the most unfavorable periods of the day — just before noon or just prior to the close of the afternoon session, when attention is at a very low ebb. In the intermediate grades, at least, all drill lessons — including writing, spelling, basal reading, drill arithmetic, etc. — should be given very favorable periods.

2. The necessity of preliminary focalization implies that a part of each drill lesson should be given over to an explanation and demonstration of the process to be automatized. The lessons in writing and spelling should be as thoroughly unified and as systematically organized as the development lessons in geography and grammar. They should concentrate upon one thing at a time and

carry that through to a successful issue. It is common to look upon exercises in writing and spelling particularly as "rest periods" for the teacher. As a matter of fact, his direction and guidance are at no time more important.

In writing, for example, the structure of the capital *D* may form the central feature of one lesson; the connection of *D* with following letters, the subject of the next, and so on. In any case, the main topic should be talked over at the beginning of the exercise, the difficulties explained, and a demonstration given by the teacher in the construction of the approved form. Then the class should practice attentively, not mechanically, under the teacher's constant criticism, until the correct adjustment is automatized.

The same is true of the spelling lesson. Each exercise should be a unity, dealing with some particular point — some rule, perhaps, or some combination that has been found to be a stumbling-block to many members of the class: the *ie* and *ei* combinations, or *principal* and *principle*. These should be focalized, talked about, and drilled upon until the correct forms flow from the pen without conscious effort.

The exercise in oral reading forms one of the best examples of the drill lesson, particularly in the "basal" reading, the very essence of which is drill. Here the appropriate posture of the pupil demands attention; it is not much more difficult for the child to acquire habits of correct posture than it is to acquire habits of incorrect posture, but it means a serious and unremitting effort on the part of the teacher for a long time. The "basal" reading lesson is also the best medium for fixing habits of good articulation: the mumbling of words, talking "in the throat," clipping final consonants and even syllables, are all lines of least resistance. But the main object of the basal reading lesson is drill in the ready recognition and

proper pronunciation of words. Here there is nothing, in the writer's opinion, that equals in efficiency the "old-fashioned" repetition of the reading selection until perfect mastery is attained.

3. In all forms of the drill lesson, the factor of focalization implies that the conditions of apperception should be fulfilled so far as possible. The pupil should see the need of correct forms, and this should give him the motive for repetition.

But even when the pupil perceives a distinct need for making a process automatic, the monotony that the necessary repetition involves may effectually discourage him from the task. It will frequently happen that nothing short of an arbitrary command, backed up, if need be, with appropriate compulsion, will keep the pupil returning to the task until it has been completed. This necessity may sometimes be averted by an intelligent use of devices that will serve to introduce a superficial variety and at the same time preserve the essential adjustments that are being automatized. In arithmetic, for example, the device commonly employed is the solution of problems, which appeals to the "puzzle instinct," so potent in children up to the age of adolescence.[1] Devices that appeal to the instinct of emulation are also profitably employed in arithmetic and spelling (as exemplified in the old-time, but still serviceable, "spelling

[1] Cf. E. H. Lindley: "A Study of Puzzles," in *American Journal of Psychology*, vol. viii, pp. 431 ff.

matches"). The exhibition of good work is another device that is commonly employed in writing, drawing, and manual training.

Two very serious dangers are involved in the use of devices. (*a*) The average teacher, finding a device successful, is almost certain to overwork it — to carry it so far that it defeats its own purpose. The device is, at best, only a means to an end, and the effort must always be to keep the end distinctly in view, and not to permit the device to become paramount in the minds of either teacher or pupils. In some schools, for example, emulation is carried to a dangerous extreme. The marks or grades are the be all and the end all of the pupil's effort. In other schools, it is the exhibition of "good" work or showy results that is the objective point of all teaching and learning. To make these things (which are excellent as devices) ends in themselves is to obscure the true purpose and to distort the normal process of education.

(*b*) The danger that the child will come to depend exclusively upon the factor of interest need not again be reverted to; it may suffice to say here that if the pupil does not sometimes find his school work disagreeable, then something is radically wrong either with the pupil or with the school or with both.

4. *The Review Lesson.* The function of the review lesson is to gather up the points that have been made in a series of development or recitation lessons, and thus

(*a*) still further organize the facts and principles into large systems, and (*b*) give these facts and principles the advantage of additional repetition. In the individual lessons that have preceded the review, the attention has been upon the various parts of the subject-matter rather than upon the connections and relations that hold the parts together. In the review lesson, the emphasis is transferred to the larger relations and thought connections.

5. It follows from this that the review lesson properly covers a series of particular points that naturally unite into a system or group. Thus in geography, a review lesson is in place after a physiographical unit — a continent, or a large river basin, or a mountain system — has been treated intensively. A series of review lessons is also very obviously in place at the close of a long course in which the threads of unity are likely to be lost from view in the wealth of detail. It is hardly too much to say that every subject of the curriculum should be thus brought to a focus in a comprehensive and thorough review.

6. Little need be said concerning the technique of the review lesson. The topical outline is eminently in place here, and the aim should be to have the larger headings kept in mind rather than presented in written form. These outlines will also be more valuable if they are made out by the pupil himself, but in such cases they should certainly be worked over in class in order that the teacher

may be sure that all points have been adequately covered, and that the outline is comprehensive and systematic. After the subject has thus been skeletonized, the various headings and the more important subheadings may profitably be memorized. This may sound unorthodox in these days of loose methods, but experience testifies that any acquisition that is worth while costs an effort, and that a thoroughly organized body of knowledge with well-articulated parts is an acquisition worth while; while experiment demonstrates that verbal repetition will serve all the better to fix such a system, once it has been worked out rationally.

7. *The Examination.* This is the capstone of the review process. Just now somewhat under the ban of the reformer, it is nevertheless an indispensable agency of education if the principles developed in the former chapters are valid.

The very essence of an examination is its formal character. So-called informal examinations or tests may be valuable for certain purposes, but they entirely miss the virile virtue that the examination, in the strenuous sense of the term, possesses. The function of the examination as a test of the pupil's knowledge is not of paramount importance, but its function as *an organizing agency of knowledge* is supreme. The period of intense application preceding the examination represents the burning-point of attention. It is a strain, to be sure, but a strain that pays. The little children, the weak-

lings, and the girls at the onset of adolescence may wisely be exempted from its operation; but for the great majority of pupils and students above the age of eight the examination is the agency of formal education *par excellence.*

The virtue of the examination lies, then, in its power to *force* strenuous mental effort to the task of organizing a large body of facts and principles into a coherent system. This is the standard by which examination questions should be set. They should be large and comprehensive, so formulated that they will bring out and exercise, not the memory for details, but the capacity to grasp large masses of knowledge and weld the separate facts and principles into systematic unities.

To this end the examination should be, from the pupil's standpoint, an important test of successful work. If the pupil realizes that success or failure depends upon "passing" his "finals," he has one of the most powerful motives — the motive of pride — for successful effort. In this sense it is true that the examination is a device; for the end of knowledge is application, not organization. But if our main contention is valid, — if organization is the most important and the most economical factor in promoting efficient recall, — then the examination is a legitimate means to a final end, and probably the most effective instrument that is at the command of the school for this purpose.

CHAPTER XXIII

THE HYGIENE OF THE EDUCATIVE PROCESS

1. IN the sense that it departs from the primitive lines of life, education is an artificial process. It represents in the individual growth what civilization represents in racial development; and, like civilization, it demands a readjustment for which the body is not *naturally* adapted.

The erect posture, the indoor life, the necessity for concentration of energy, the necessity for persistent inhibition of normal impulse, the eating of cooked foods and the drinking of warm liquids, the use of artificial means of shelter and protection — all these indicate in some measure the particulars in which man differs from his immediate forbears in the animal series; and while all these things mean much to human life, man's body is not in every case adapted to the changes that they involve. This lack of perfect balance finds expression in the many ills and ailments peculiar to humanity. The erect posture relieves the upper limbs of the function of locomotion and preserves the equilibrium of the body, which would otherwise be rendered unstable by the

disproportionate development of the brain. Yet this posture also exposes the viscera of the abdomen, which have no bony protection, and so paves the way for enteric complaints. By this means, too, additional labor is placed upon the heart. In woman, the erect posture has shifted the center of gravity in the reproductive organs, causing a transference of strain to a point that has not been given increased strength to bear its added responsibilities. Again, the concentration and inhibition imposed by modern conditions make enormous demands upon nervous energy, which not infrequently find their culmination in nervous disintegration, correlated on the mental side with decay and degeneration. Similarly, the dependence upon prepared foods demands a readjustment in the digestive process which is not always satisfactory to the individual chiefly interested.

In short, the old maxim, "Nature never does anything by halves," is quite overthrown in the case of man. The very virtues of civilization impose upon every one who lives the social life the paradoxical obligation to break nature's laws. How to get the most out of life with the least suffering, how to do the best work with the least drain, how to be human and civilized and still be a healthy animal, are problems that can only approximate solution through compromise. When the best life entails no physical suffering, when the best work can be done without danger of nervous breakdown, when civilization and culture fail to demand some violation of primitive laws, man

will have developed into a being that will have little bodily resemblance to his present self.

2. In the work of the school this process of readjustment imposes the following conditions: —

(*a*) The child's normal tendency is toward an active out-of-door life with an abundance of oxygen and sunlight; the school demands an indoor life with a possible insufficiency of oxygen and sunlight.

(*b*) The normal tendency is toward great freedom of movement, with only brief periods of quiescence during waking hours; the school demands a marked inhibition of movement and comparatively long periods of bodily quiescence.

(*c*) The natural tendency is toward the coarser adjustments, involving the large muscles; the school demands the finer adjustments, involving the smaller muscles. This is especially true in eye movements. To make accurate scrutiny of fine details at short range during periods of long duration is a task for which the human eye in its present condition is very poorly adapted.

(*d*) Closely related to (*c*) is the demand that the school makes upon the child for active attention. The conquest of impulse, which is the keynote of civilization and morality, means inhibition and a consequently large expenditure of nervous energy.

To fulfill these requirements in such a manner that the process of education will not defeat its own purpose is a difficult task upon its face. It is easy to go to ex-

tremes: the pupil's natural tendencies may be respected and indulged, and his bodily health possibly preserved thereby. But in this case his civilization is not accomplished, but only postponed to a more unfavorable period. On the other hand, the most exacting requirements that social life demands may be fulfilled if the school neglects the hygiene of stress and strain. But the individual who is thus treated, while he may bear some of the earmarks of culture and civilization, is more than likely to miss the most essential element of all,— a sound body and physical well-being.

3. The hygiene of the educative process may be discussed under two heads: (1) the fulfillment of certain hygienic requirements that underlie the successful operation of other factors of the educative process, and (2) the formation of habits and ideals that condition a healthful life in general.

(1) *The Hygiene of Instruction.* Certain conditions of light, temperature, ventilation, fatigue, etc., must be observed if the pupil is maximally to profit by the work of the school. These conditions may be disposed of briefly in this place, not because they are not important, but because a detailed discussion is rendered superfluous by the numerous treatises [1] and text-books [2] that so ade-

[1] Especially the monumental work of Burgerstein and Netolitzky: *Handbuch der Schulhygiene*, Jena, 1902.

[2] L. Kotelmann: *School Hygiene*, English trans., Syracuse, 1899; E. R. Shaw: *School Hygiene*, New York, 1901; A. Newsholme: *School Hygiene*, Boston, 1894.

quately cover the field. Only the most salient and practical principles will, therefore, find a place in the following brief outline.

(*a*) *Light.*[1] The light of the schoolroom should come exclusively from the left, although rear windows that can be adequately shaded by opaque curtains may be useful for ventilation. The actual glass surface should be from one sixth to one fourth of the floor surface of the room, under normal conditions.[2] Inadequate lighting means a serious danger of eye strain, with its attendant headaches and general interference with the best work.

(*b*) *Temperature.*[3] The temperature generally recommended for schoolrooms in this country is from 68° to 72° F. Wide variations from this norm are apt to cause restlessness and distraction. Each room should be provided with three or four good thermometers, which should be hung in different parts of the room, at 3 to 3½ feet above the floor. Where the regulation of temperature is not provided for by a thermostat, the thermometers should be read and the temperature recorded by one of the pupils, the readings being placed upon the blackboard, where the teacher can learn at a glance the temperature of the room.

(*c*) *Ventilation.*[4] There seems to be a disagreement among authorities as to the specific cause of the mental depression that is felt in all ill-ventilated rooms, but there can be no doubt either of the fact of depression or of the fact that fresh air removes the cause, whatever it may be. The standard of

[1] Burgerstein and Netolitzky, pp. 209–230; Shaw, pp. 8–26.

[2] In the mountain regions, owing, doubtless, to the exceptionally clear skies and translucent atmosphere, this ratio, it has been found by careful tests in the Montana State Normal College, may be safely reduced to one twelfth.

[3] Burgerstein and Netolitzky, pp. 266–272; Shaw, pp. 65 ff.

[4] Burgerstein and Netolitzky, pp. 272–307; Shaw, pp. 68–109.

air renewal is 30 cubic feet each minute for every pupil. The texts referred to will furnish various methods for determining whether a given system of ventilation is efficient in this degree. When windows are opened for ventilation, care should be taken to prevent drafts from falling upon the pupils. Exchange of air between the interior and exterior of a building is proportional to the difference in temperature; in cold weather the air will circulate readily, but when the temperature of the room is approximately that of the outside air, the rate of interchange is greatly diminished. Shaw recommends that, in buildings having no fan system, the windows be opened once every hour, and the air of the room thoroughly renewed. The children should be exercised during these periods, and the temperature must not be unduly reduced. In buildings ventilated by the fan system, windows should not be opened while the fan is operating. If they are, the system of incoming and outgoing drafts, upon which the fan system depends for its efficiency, will be upset, and with deleterious consequences. No small part of the opposition to fan ventilation results from the persistence of teachers in opening windows while the fan is in operation.

(*d*) *Fatigue.*[1] Despite the numerous researches concerning the factors of fatigue and their operation in the school, this is still a dark chapter of school hygiene. It is extremely difficult to segregate the "central" from the "peripheral" factors — to devise a test that will adequately measure the exhaustion of the nerve cells rather than the fatigue of the muscles or the mere feeling of "tiredness," which may not in the least mean nervous exhaustion.

Three general methods[2] of investigation have been employed with varying degrees of success: (1) the *dictation-computation*

[1] Burgerstein and Netolitzky, pp. 454–718; Shaw, pp. 227–234; Kotelmann, ch. vii.

[2] A clear account of these methods is given by Kotelmann, ch. vii.

method, used extensively by Sikorsky, Burgerstein, and Teljatnik; in brief, consisting in the dictation of sentences of equal length and difficulty, or the assignment of problems of equal difficulty, under varying conditions, and a comparison of the errors; (2) the *ergographic* method, based on the assumption that the disintegration of nerve substance, after reaching a certain point, results in a specific chemical poison, which is diffused through the system and which interferes with muscular activity; muscular strength, as measured by an ergograph or recording dynamometer, thus becoming an index of the condition of the nerve cells; a method used extensively by Mosso and Keller, and perhaps, all in all, the most satisfactory test; and (3) the *æsthesiometric* method, introduced by Griesbach, employing an æsthesiometer for determining the sensitivity of the skin, under the assumption (now generally believed to be fallacious) that exhaustion of the central nerve cells decreases this sensitivity.

From the comprehensive digest of the literature made by Burgerstein and Netolitzky, the following principles appear to be fairly well established: —

(1) Certain types of mental work induce fatigue more rapidly than other types of work. All authorities seem to agree that mathematics, gymnastics, foreign, and especially ancient, languages are more fatiguing than the mother tongue, geography, and history. The following series, showing decreasing fatigue indices, are typical; the first is presented by Wagner on the basis of æsthesiometric tests, the second by Kemsies on the basis of ergographic tests:[1] —

Wagner: mathematics, Latin, Greek, gymnastics, history, geography, arithmetic, French, mother tongue (German), nature study, drawing, religion.

Kemsies: gymnastics, mathematics, foreign language, religion, mother tongue, natural science, geography, history, singing, drawing.

[1] Burgerstein and Netolitzky, p. 569.

(2) In general, it would seem that the fatiguing studies are (*a*) those involving a great deal of muscular effort, (*b*) those involving abstract judgments, and (*c*) those involving drill in form; while the less fatiguing subjects are predominantly those in which the thought or content is uppermost, and those involving objective factors.

(3) The curve of work capacity presents the form of a series of waves, indicating that the function is rhythmic. The best work is not done at the very outset, but only after a certain inertia has been overcome or a certain momentum gained. This is clearly brought out by the ergographic researches of Keller.[1]

(4) There is probably a seasonal variation in work capacity, the curve, according to Shuyten,[2] reaching its highest points in December and January and its lowest point in July.

(5) The daily work curve for normal children on a "free day" — such as our Saturday — was found by Teljatnik[3] to decrease gradually until noon, then to rise again at two o'clock to a point somewhat above the morning's maximum, then to fall rapidly until about five o'clock, when it reached the low point of the afternoon. On a school day, however, the curve in the morning declines much more rapidly, and reaches a lower point at noon; the afternoon high point is much lower than on a free day, and the afternoon decline not quite so rapid.

(6) There appears to be little experimental evidence as to variations in work capacity at different stages of growth. The optimal length of the recitation and study periods is generally conceded to increase as the child grows older, and the following determinations, credited to Chadwick,[4] represent the best practice in American schools: —

[1] Burgerstein and Netolitzky, p. 572. [2] *Ibid.* p. 582. [3] *Ibid.* p. 597.

[4] S. H. Rowe: *Physical Nature of the Child*, pp. 167–168; Shaw, pp. 229 f.; Burgerstein and Netolitzky, p. 545.

From 5 to 7 years of age, all periods are 15 minutes' duration.

From 7 to 10 years of age, all periods are 20 minutes' duration.

From 10 to 12 years of age, all periods are 25 minutes' duration.

From 12 to 16 years of age, all periods are 30 minutes' duration.

(*e*) *The Special Hygiene of Reading and Writing.*[1] It is in connection with reading and writing that there is probably the greatest danger of evil consequences from a violation of hygienic laws.

(1) The posture in reading is particularly important. Desks should be so adjusted that the books and papers laid thereon will be not more than twelve inches from the eyes when the pupil sits erect. In the class exercises in reading the pupil when standing should acquire the habit of holding the book at this distance from the eyes. Where pupils find this difficult, they should be examined by a competent oculist.[2]

(2) The posture in writing is also a matter of profound importance. One of the leading defects of the "slant" system of penmanship is its inevitable tendency toward an asymmetrical position of the body, leading to lateral curvature of the spine. The vertical system, properly taught, eliminates this danger and is, from the hygienic standpoint, by far the most satisfactory method. In any case it is safe to say that no system of writing should be employed that does not permit the paper to be placed directly in front of the child and not at an angle. The pupil should sit erect with his feet flat on the floor and his head well elevated.

(3) The minimum size of type that can be used without

[1] Burgerstein and Netolitzky, pp. 602–642; Shaw, chs. ix and x.

[2] With a little training in the use of the Snellen test types, the teacher may readily diagnose the more common defects of vision.

injury to the normal eye has been determined by Cohn to be 1.5 mm. in height and 0.25 mm. in breadth for the smallest n, and the length of the longest line should not exceed 10 cm. (4 inches). For the first school year, Shaw[1] recommends type not smaller than 2.6 mm. in height for the smallest n, with a "leading" of 4.5 mm. For the third year the height should be not less than 2 mm., with 4 mm. leading; for the fifth year, 1-8 mm. in height and 3.6 mm. leading. No school books, he maintains, should have type smaller than 1.6 mm. in height nor leading closer than 3 mm.

(4) Slates are unhygienic for at least two reasons: (*a*) the unclean habits that they promote; and (*b*) the lack of a sharp contrast between the pencil mark and the background. Blackboards should be dead black and unglazed, and the crayon should be soft enough to make a clear, heavy stroke. Shaw states that blackboard letters for the older pupils should be not less than 7 mm. in height and much larger for the younger pupils.

(*f*) *Cheerfulness as a Factor in the Educative Process.* That a maximal degree of efficiency in any line of work is inconsistent with gloom and depression is not only a common verdict of general experience, but a logical inference from scientific principles. It is a well-established law of psychology[2] that a state of mind which is predominantly "pleasant" in its affective coloring is always accompanied by certain well-defined physiological phenomena: (1) an increase in the volume of the body, due to a distention of the capillaries running underneath the skin; (2) deeper breathing; (3) increased rate of pulse

[1] Shaw, *op. cit.*, pp. 175 ff.

[2] Cf. E. B. Titchener: *Outline of Psychology*, p. 112.

beat; and (4) increased muscular energy. A state of mind which is "unpleasantly" toned, on the other hand, is accompanied by bodily phenomena of the opposite character: decrease in bodily volume, lighter breathing, decreased rate of pulse beat, and decreased muscular energy.

The relation of these factors to efficiency is obvious. Hope and buoyancy simply mean, other things equal, a favorable condition for good work of any sort, while gloom and depression must, by the same token, form a heavy handicap in any line of endeavor. The old proverb, "Nothing succeeds like success," is thus seen to be, like so many other proverbs, a profound psychological law. The glow of satisfaction that comes from the consciousness of work well done sets free the energy that can be concentrated upon the new and more difficult task, thus multiplying the chances for a fresh triumph. And the sickening sense of failure will similarly choke up the channels of energy and multiply the chances for a second defeat. The man who, in the face of this handicap, can pluck success out of failure and victory out of defeat is the rarest of heroes.

It is needless to say that cheerfulness and encouragement should be the keynotes of instruction. This does not mean that the teacher must "coquette for the good will of the child," or "tickle his vanity with praises and prizes," or that scamped work should be tolerated, or that there is no place in the educative process for the

pain economy and the unquestioned, uncomplaining performance of disagreeable tasks. It does mean, however, that honest, efficient work should be candidly and honestly recognized; that criticism of all kinds should be positive rather than negative, constructive rather than destructive; and above all that petty and querulous fault-finding and the sarcasm and ridicule that are worse than blows have no legitimate function in the school.

4. (2) *Hygienic Habits and Ideals.* In the process of readjustment involved in the transition from a primitive to a civilized mode of life, the instinctive or impulsive reactions which are adapted to pre-social conditions must be modified or replaced by reactions designed to further social ends. Some of these reactions will function chiefly in preserving health and bodily well-being amid the changes incident to the general readjustment. Thus the habits of correct posture, graceful carriage, exercise, cleanliness, moderation, are ultimately hygienic habits, and the ideals through which they are generalized are hygienic ideals,— beauty, grace, health, chastity, temperance, love of outdoor life. These hygienic habits and ideals might be called the balance wheels of civilization; it is through their operation that man has so far escaped annihilation at the hands of the very agencies that have lifted him up.

There is no sterner duty laid upon the teacher than the development of these habits and ideals. A large public school is a fertile ground for implanting the seeds of

disease and vice. The mind of the child at any time after the eighth year is predisposed to impulses that are vulgar and degrading. Some of these reactions may be "natural" enough: they are not always to be looked upon as abnormalities or perversions; but under the conditions of modern life they are none the less disastrous, and it is precisely at this point that some form of education or external guidance becomes essential to the salvation of the race. If the dictum, "Follow nature," is ever fallacious, it certainly is here, for here nature is working at cross purposes, pitting instincts and impulses so evenly against one another that the composition of forces, if left to the operation of natural law, could hardly fail to equal zero in practically every case.

5. In dealing with children between the ages of eight and twelve there is little room for freedom or liberty. Ceaseless vigilance is here the price of success, and this vigilance must extend to every nook and cranny of the child's nature. Uncleanliness of all sorts grows with the growth. Filth breeds filth, both mentally and materially. The germs must be nipped in the bud if infection is to be prevented. The general treatment must be aseptic, the specific treatment antiseptic.

This lays a heavy task of police duty upon the teacher — and a task that he cannot escape. It is disagreeable to make daily, perhaps sometimes hourly, inspections of closets and vaults and fence corners in order to cull out the inevitable indecencies — but nothing else will do it. It seems a poor use

of valuable time to force one's adult presence upon the playground at recess; but when five hundred or even thirty little children need no supervision, the very significance of infancy as a period of necessary dependence will have passed away.

6. In dealing with adolescents, as was suggested in a former chapter, specific methods must be employed, differing radically from those used in the pre-adolescent period. Arbitrary rulings and summary punishments must give place to reason; and the hygienic habits that have been formed largely by mechanical processes in the earlier years must now be generalized and justified on the basis of ideals.

Adolescence brings with it the source of the gravest dangers to health and morals in the coming into function of the sex instinct. The post-pubertal years are, indeed, the crucial point in the readjustment from primitive to social conditions. The pushing forward of sexual maturity is enough in itself to occasion serious consequences; but when, with sexual maturity accomplished, the normal function of reproduction is still further postponed, through social forces, for fifteen or even twenty years, a condition is created the gravity of which we are just beginning to appreciate. It is impossible to estimate what proportion of the disease, the vice, and the misery of modern life owe their inception to the perverted and abnormal functionings of the sex instinct during youth; but every new investigation in this forbidding field yields sufficient data to cause increased alarm. In the light of what knowl-

edge we now possess — and this is little enough — one is almost bound to adopt a pessimistic attitude toward the destiny of the race; to admit, unwillingly though one may, that civilization is indeed playing a desperate game, and that the very forces that have lifted man so far above the brute may yet operate to annihilate his species.

In all this murky atmosphere of pessimism and doubt there is but one faint beacon light of hope,— the school. Civilization is indissolubly bound up in the ever lengthening period of immaturity. Education, which is the guardian of civilization, owes its efficiency to the same factor. In return for this priceless advantage, education must in some way make up for nature's lack of foresight. It can do this in part by replacing ignorance and mystery with knowledge, in part by insuring an environment that is free from suggestions of evil, in part by segregating the sexes, in part by developing the highest ideals of purity and honor. At best the task is Herculean ; but if education fails in this one supreme test, it needs no prophet's vision to perceive that human progress, for which education stands sponsor, will sooner or later end in a cul-de-sac.

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